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THE OPEC OF POTATOES: SHOULD COLLUSIVE AGRICULTURAL PRODUCTION RESTRICTIONS BE IMMUNE FROM ANTITRUST LAW ENFORCEMENT?

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ABSTRACT

The Capper-Volstead Act, a pre-Depression era statute that allows farmers to cooperate in marketing goods, has been interpreted to permit farming cartels to avoid the application of antitrust law. Such cooperatives set production limits designed to reduce quantities so that prices rise. Normally, horizontal output restrictions would constitute per se *violations of antitrust law. Does the Act permit collusion so that production is restricted? An unclear legislative history and a lack of adjudicated cases have left agricultural producers uncertain about the legality of coordinated production limitations under the Capper-Volstead Act. While the practice remains extant—at significant cost to buyers—there are no judicial decisions determining whether the practice is legal. Four class action cases have been filed in recent years involving supply control under the Act (in the milk, egg, mushroom, and potato industries). However, because of the expense, uncertainty,*

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and high stakes of such cases, they are likely to settle (as have two of the four cases in whole or in part).

Because such cases rarely go to trial, there is a lack not only of judicial opinions on the legality of horizontal production restraints among agricultural producers, but also of publicly available economic analysis on the cost of such collusion. We examine the potato industry and conclude that coordinated production caps significantly increased the cost to buyers, with an average nationwide overcharge of 30.0% for fresh potatoes and 48.7% for Russet potatoes at the point of shipping, and 24.4% for fresh potatoes and 36.5% for Russet potatoes at the wholesale level. The social welfare costs are thus substantial.

This costly collusion has gone almost unexamined and unregulated. An analysis of the Capper-Volstead Act shows that it should be interpreted to encourage—not thwart—competition, and therefore, should not provide antitrust immunity to farmers who collude to restrict output.

I. INTRODUCTION

IN 2005, America's potato farmers, buffeted about by market volatility and high supply, banded together to form the United Potato Growers of America (UPGA), a collective of farmers and agricultural cooperatives that agreed to reduce the output of potatoes. Within its first year, UPGA reportedly controlled more than sixty percent of the nation's fresh potato growing acreage and had reduced the volume of the U.S. and Canadian markets by 6.8 million cwt,[1] resulting in an increase in the open market price of potatoes by 48.5 percent.[2] By 2007, UPGA had reduced potato-growing acreage by 20% from its 2004 levels.[3]

But wait, aren't collusive production controls illegal under antitrust law? The answer, apparently, is maybe.

Agricultural cooperatives are permitted, under the Capper-Volstead Act, to combine for the purpose of processing and marketing their products.[4] The purpose of the pre-Depression era statute was to give farmers a competitive advantage similar to that held by the more consolidated (and often incorporated) buyers of their products.[5] The Act clearly permits farmers to share processing, packaging, and shipping facilities, for example, to achieve economies of scale and to collectively sell their products at a price the cooperative sets (which might otherwise be illegal for typical competitors). But does this antitrust exemption permit farmers to collude to reduce their

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1 1 cwt (centrum weight) equals 100 pounds.

2 Timothy W. Martin, *This Spud's Not for You: Growing Co-Op of Farmers Seeks to Become OPEC of Potatoes by Controlling Supply*, WALL ST. J., Sept. 26, 2006, at B1(2).

3 Shirley Wentworth, *Watching Out for Potatoes*, OTHELLO OUTLOOK, Jan. 3, 2008, at 1.

4 Capper-Volstead Act, ch. 57, 42 Stat. 388 (1922) (codified as amended at 7 U.S.C. § 291 (2012)).

5 Md. & Va. Milk Producers Ass'n, Inc. v. United States, 362 U.S. 458, 466 (1960).

output for the purpose of raising prices? Certainly the UPGA thought so and, in an article tracking the organization's success, the *Wall Street Journal* enthused, "[t]he spud cartel's manipulation of supply is perfectly legal."[6] Noting that one farmer destroyed part of his potato crop to keep prices high, the *Journal* goes on to observe that the UPGA "aspires to be to potatoes what OPEC is to oil by carefully managing supply to keep demand high and constant."[7]

No court, however, has held that combinations of agricultural producers who restrict output are exempt from antitrust law enforcement.[8] While four class-action lawsuits have been filed in recent years concerning agricultural cooperatives (including milk,[9] egg products,[10] mushrooms,[11] and potatoes[12]), none has been taken to verdict. Because of the nature of class action lawsuits, with their high risk and potentially high reward, such cases tend to settle (and, in fact, two of the four cases have settled).[13]

This decision vacuum has left us without judicial guidance on the legality of agricultural cartels that limit production.[14] At the same time that there is a lack of clarity on the legality of such behavior, there is likewise a lack of publicly available economic analysis on the cost of such collusion.

In this paper, we examine the circumstances surrounding the potato industry cartel and review the questions of (1) whether collusive behavior to restrict output by agricultural producers is exempt from antitrust law enforcement, and (2) the extent of the harm to buyers.

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6 Martin, *supra* note 2.

7 *Id.*

8 *In re* Fresh & Process Potatoes Antitrust Litig., 834 F. Supp. 2d 1141, 1154 (D. Idaho 2011). Author Michael A. Williams served as a testifying expert and author Wei Zhao served as a consulting expert for the plaintiffs in the matter. The authors have agreed to abide by the protective order entered into in that litigation, and all of the materials used in this paper are from publicly available sources.

9 Edwards v. Nat'l Milk Producers Fed'n, No. C 11-04766 JSW, 2014 WL 4643639 (N.D. Cal. Sept. 16, 2014).

10 *In re* Processed Egg Prods. Antitrust Litig., No. 08-MD-02002, 2014 WL 6388436 (E.D. Pa. Nov. 17, 2014).

11 Revised Consolidated Amended Class Action Complaint, *In re* Mushroom Direct Purchaser Antitrust Litig., No. 06-0620, 2014 WL 5149082 (E.D. Pa. Oct. 14, 2014).

12 *Potatoes*, 834 F. Supp. 2d 1141.

13 For a discussion, see Nathan Bender, *Continuing Uncertainty for Dairy Cooperatives: Does Capper-Volstead Allow Dairy Cooperatives to Limit the Production of Raw Milk Through Cooperative Member Herd Retirement?*, COLUM. BUS. L. REV. (Dec. 4, 2015), http://cblr.columbia.edu/archives/13619.

14 The *Potatoes* court, for example, characterized the case law as "scant," and, although it was not the basis for its ruling, addressed issues of the meaning of the Act so as to reduce the cost of litigation. *Potatoes*, 834 F. Supp. 2d at 1151–52.

II. ANALYSIS OF LEGALITY UNDER THE CAPPER-VOLSTEAD ACT OF AGREEMENTS TO LIMIT THE PRODUCTION OF AGRICULTURAL PRODUCE

A. Capper-Volstead Act

Farmers, historically operating small and often family-run businesses, experienced competitive disadvantages when selling to generally larger and more consolidated buyers. Banding in agricultural cooperatives allowed farmers to negotiate more successfully in agricultural markets. The Capper-Volstead Act was enacted in 1922 with the purported aim of helping small farmers consolidate marketing activities so as to gain competitive advantage and to ensure that their efforts to form cooperatives would not run afoul of the antitrust laws.[15] The Act allows agricultural "producers" to "act together" in "collectively processing, preparing for market, handling, and marketing" their products in interstate and foreign commerce.[16] Thus, it was hoped, farmers would have an increased ability to reduce marketing costs, coordinate to cope with market fluctuations, and have greater negotiating power with large buyers.[17] This would allow farmers to join to "survive against the economically dominant manufacturing, supplier, and purchasing interests with which they had to interrelate"[18] and would give farmers the same right to bargain collectively as had corporations.[19]

B. Legality of Behavior

Horizontal cartels among competitors that decrease output or reduce competition in order to raise prices, the U.S. Supreme Court held, "[are], and ought to be, *per se* unlawful."[20] The question is whether the Capper-Volstead

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15 For a discussion, see Analee Heath Leach, *The Almighty Railroad and the Almighty Wal-Mart: Exploring the Continued Importance of the Capper-Volstead Act to the American Farmer and the Agricultural Marketplace*, 32 HAMLINE J. PUB. L. & POL'Y 261, 263–66 (2010).

16 Capper-Volstead Act, ch. 57, 42 Stat. 388 (1922) (codified as amended at 7 U.S.C. § 291 (2012)).

17 Bender, *supra* note 13 (referring to the dairy industry).

18 Nat'l Broiler Mktg. Ass'n v. United States, 436 U.S. 816, 830 (1978) (Brennan, J., concurring).

19 Md. & Va. Milk Producers Ass'n, Inc. v. United States, 362 U.S. 458, 466 (1960).

20 Leegin Creative Leather Prods. v. PSKS, Inc., 551 U.S. 877, 893 (2007); *see also* Palmer v. BRG of Ga., Inc., 498 U.S. 46, 48 (1990) (agreement to control supply of commodity "for the purpose and with the effect of raising, depressing, fixing, pegging or stabilizing the price of a commodity in interstate or foreign commerce is illegal *per se*") (quoting United States v. Socony-Vacuum Oil Co., 310 U.S. 150, 223 (1940)); United States v. Andreas,

Act exempts agricultural cooperatives from antitrust liability when they collude to reduce production so as to raise prices. The Capper-Volstead Act provides an exemption to agricultural producers for "collectively processing, preparing for market, handling, and marketing" their products.[21] The term "marketing" has been interpreted (with the court employing *Webster's New Collegiate Dictionary*) as the "aggregate of functions involved in transferring title and in moving goods from producer to consumer, including among other things buying, selling, storing, transporting, standardizing, financing, risk bearing, and supplying market information."[22] In a 1960 attempted monopolization case, the U.S. Supreme Court noted that the purpose of the Act was "to make it possible for farmer-producers to organize together, set association policy, fix prices at which their cooperative will sell their produce, and otherwise carry on like a business corporation without thereby violating the antitrust laws,"[23] but did not vest cooperatives with unrestricted power to restrain trade or to achieve monopoly.[24] The Court noted with approval a House Committee Report providing that "[i]n the event that associations authorized by this bill shall do anything forbidden by the Sherman Antitrust Act, they will be subject to the penalties imposed by that law."[25]

Arguments in favor of interpreting Capper-Volstead to permit production restrictions include the legislative history, which had, as an aim, that agricultural cooperatives could have the same advantages in the market as do corporations.[26] Because corporations could surely decide to restrict the output of their products, why not extend that same ability to cooperatives? Similarly, because the Act permits "marketing," some argue, this should include all decisions about getting goods to market, including planting

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216 F.3d 645, 667 (7th Cir. 2000) ("Functionally, an agreement to restrict output works in most cases to raise prices above a competitive level, . . . and for this reason, output restrictions have long been treated as *per se* violations"); Phillip E. Areeda & Herbert Hovenkamp, 11 ANTITRUST LAW ¶ 1910, at 312–13 (3d ed. 2006) (horizontal output limitations "are ordinarily condemned as a matter of law under an 'illegal per se' approach") (quoting NCAA v. Bd. of Regents, 468 U.S. 85, 100 (1984)).

21 7 U.S.C. § 291 (2012).

22 Treasure Valley Potato Bargaining Assoc. v. Ore-Ida Foods, Inc., 497 F.2d 203, 215 (9th Cir. 1974) (quoting WEBSTER'S NEW COLLEGIATE DICTIONARY (1953)).

23 *Md. & Va. Milk Producers Ass'n*, 362 U.S. at 466.

24 *Id.* at 467.

25 *Id.* at 467 (quoting H.R. Rep. No. 24, 67th Cong., 1st Sess., at 3 (1921)).

26 *Id.* at 466 ("[I]ndividual farmers should be given, through agricultural cooperatives acting as entities, the same unified competitive advantage – and responsibility – available to businessmen acting through corporations as entities.").

restrictions.[27] Finally, there is the "common sense" argument that if farming cooperatives are permitted to destroy crops (which some argue would be permitted under the Act),[28] why deny them the ability to coordinate planting upstream of the packaging and selling activities? "Such an outcome," one commentator notes, allows cooperatives to control the quantity of the product that reaches the market and avoids "unnecessary costs, wasted resources, opportunity costs, and negative environmental impacts."[29]

There are strong arguments, however, that Capper-Volstead should not be interpreted as allowing production restrictions to escape antitrust regulation. One factor is the language of the Act itself. The rarely invoked Section 2 of the Capper-Volstead Act permits the Secretary of Agriculture to issue cease-and-desist orders (with subsequent prosecution, if any, by the U.S. Department of Justice) to any association that "monopolizes or restrains trade in interstate or foreign commerce to such an extent that the price of any agricultural product is unduly enhanced thereby."[30] Although the Secretary has never, apparently, exercised this power,[31] it indicates congressional intent that the Act be subject to antitrust regulation. By contrast, the Fisherman's Cooperative Act, with language that otherwise parallels the Capper-Volstead Act, expressly allows for cooperatives to exercise control over production.[32]

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27 A cooperative could presumably "take possession of its members' supply, store it, and decide how much inventory to sell into the market and at what prices – and how much inventory to hold back to influence higher prices" and still fall within *Treasure Valley*'s "marketing" definition. Kenneth R. O'Rourke & Andrew Frackman, *The Capper-Volstead Act Exemption and Supply Restraints in Agricultural Antitrust Actions*, 19 COMPETITION: J. ANTITRUST & UNFAIR COMP. L. SEC. ST. B. CAL. 69, 84 (2010) (on file with authors).

28 Christine A. Varney, *The Capper-Volstead Act, Agricultural Cooperatives, and Antitrust Immunity*, 10-2 ANTITRUST SOURCE 1, Dec. 2010, at 7, http://www.americanbar.org/content/dam/aba/publishing/antitrust_source/Dec10_Varney12_21.authcheckdam.pd.

29 Andrew J. Frackman et al., Presentation to the New York State Bar Association, Antitrust Section Executive Committee: The Capper-Volstead Act Exemption and Supply Restraints in Agricultural Antitrust Actions (Feb. 16, 2011) (slide 19).

30 7 U.S.C. § 292 (2012).

31 U.S. DEP'T OF JUSTICE, REPORT OF THE TASK GROUP ON ANTITRUST IMMUNITIES 12 (1977). Between 1922 and 1978 there were a reported seven investigations of cooperative prices, none of which resulted in the Secretary taking any action. Ralph H. Folsom, *Antitrust Enforcement Under the Secretaries of Agriculture and Commerce*, 80 COLUM. L. REV. 1623, 1634–35 (1980). For a discussion, see Peter C. Carstensen, *Agricultural Cooperatives and the Law: Obsolete Statutes in a Dynamic Economy,* 58 S.D. L. REV. 462, 491–92 (2013).

32 15 U.S.C. § 521 (2012). The Fisherman's Collective Marketing Act permits fishermen to act together in "preparing for market, processing, handling and marketing" fish (similar, in other words, to the Capper-Volstead Act) but additionally permits them to work together in "catching" and "producing" fish, language which has no parallel in the Capper-Volstead Act.

Presumably Congress would have noted if such production restrictions were permitted to be imposed on agricultural producers. Similarly the Agricultural Marketing Agreement Act (AMAA),[33] enacted during the Depression to bolster farm revenues, allows the Secretary of Agriculture to make "marketing orders" regarding certain commodities that may include production limitations, but only with review and approval by the Department of Agriculture.[34] These marketing orders are not expressly exempt from antitrust law enforcement, and in fact may include a prohibition on "unfair methods of competition and unfair trade practices."[35] Because the Capper-Volstead Act includes language that permits the Secretary of Agriculture and the Department of Justice to pursue antitrust allegations, and because the Act has no language similar to the AMAA or Fisherman's Cooperative Act that allows for oversight of production caps, it appears that the Capper-Volstead Act was not intended to permit farmers to collectively agree to limit production.[36] Further, the AMAA marketing order structure itself is under attack. A recent Supreme Court decision invalidated penalties assessed to a raisin farmer for failing to follow a marketing order, finding that the scheme constituted an unconstitutional taking.[37]

That the Capper-Volstead Act was not exempt from antitrust regulation was the conclusion reached, in dicta, in *In re Fresh and Process Potatoes Antitrust Litigation* ("*Potatoes*").[38] The district court noted that both the legislative and case history precluded permitting output restrictions under the Capper-Volstead Act. The court found unpersuasive the argument that because cooperatives could set prices they should be allowed to set output restrictions.[39] If prices rise, the court observed, farmers will increase output, and "consumers will not be overcharged."[40] "Individual freedom to produce more in times of high prices is a quintessential safeguard against Capper-Volstead abuse," the court noted, "which Congress recognized in enacting the

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33 Agricultural Marketing Agreement Act, ch. 641, 49 Stat. 750 (1935) (codified as amended in various sections of 7 U.S.C.).

34 7 U.S.C. § 608c(1) (2012).

35 *Id.* § 608c(7)(A).

36 For a comprehensive analysis of the legislative history, see Alison Peck, *The Cost of Cutting Agricultural Output: Interpreting the Capper-Volstead Act*, 80 MO. L. REV. 451, 462–86 (2015). According to the Agriculture Secretary, the Obama Administration had no interest in examining Capper-Volstead antitrust issues. Ryan Summerlin, *Co-ops Not Focus of Anti-Trust Probe*, TRI-STATE LIVESTOCK NEWS (June 25, 2010), http://www.tsln.com/article/20100627/TSLN01/100629993.

37 Horne v. U.S. Dep't of Agric., 135 S. Ct. 2419 (2015).

38 *See Potatoes*, 834 F. Supp. 2d 1141, 1152 (D. Idaho 2011).

39 *Id.* at 1154–57.

40 *Id.* at 1156.

statute."[41] The U.S. Supreme Court has refused to imply antitrust exemptions unless necessary to effectuate a statutory scheme,[42] and there is little reason to believe that they would with respect to Capper-Volstead, when such an interpretation appears contrary to the legislative scheme. The *Potatoes* court noted that it had analyzed the issue (which was not necessary for its ruling) in part because there was so little case law on the topic.[43] The disposition of the *Potatoes* case[44] leaves us where we began, with widespread agreements to limit the production of agricultural goods resulting in significant economic impact on the market and a lack of judicial guidance on the legality of the practice.

C. Economic Harm

But does permitting consolidated activities among agricultural cooperatives raise prices for buyers? Traditional economic theory would indicate so. The U.S. Department of Justice has noted that antitrust exemptions tend to benefit concentrated interest groups while the costs are spread broadly among consumers in the form of "higher prices, reduced output, lower quality, and reduced innovation."[45] The concentration of incentives inspires interest groups to advocate politically for continued protections while the costs—spread broadly among consumers—are unlikely to lead to comparable investments in consumer-driven political advocacy.[46]

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41 *Id.*

42 *See, e.g.*, Gordon v. N.Y. Stock Exch., Inc., 422 U.S. 659, 683 (1975) (The proper approach, when possible, is to "reconcile the operation of the antitrust laws with a regulatory scheme.").

43 *Potatoes*, 834 F. Supp. 2d at 1154. The *Potatoes* case also included allegations that non-farmers participated in the cooperative, which, if proven, would presumably have invalidated any defense under the Capper-Volstead Act. *See, e.g.*, Nat'l Broiler Mktg. Ass'n v. United States, 436 U.S. 816, 826–29 (1978).

44 Orders Granting Final Approval of Class Action Settlement, *In re* Fresh & Process Potatoes Antitrust Litig., No. 4:10-MD-2186-BLW (D. Idaho Dec. 14, 2015), Doc. No. 904, https://www.gpo.gov/fdsys/pkg/USCOURTS-idd-4_10-md-02186/pdf/USCOURTS-idd-4_10-md-02186-37.pdf. The settlement value was a purported $25 million along with a seven-year consent order not to engage in acreage management. The reported value to direct purchasers of potatoes over the seven-year period was estimated to be $1.6 billion to $2 billion. Kevin Penton, *Potato Growers Strike $25M Deal to End Antitrust Claims*, LAW360 (June 18, 2015, 5:02 PM), http://www.law360.com/articles/669423/potato-growers-strike-25m-deal-to-end-antitrust-claims.

45 ANTITRUST MODERNIZATION COMM'N, REPORT AND RECOMMENDATIONS 335 (2007), http://govinfo.library.unt.edu/amc/report_recommendation/amc_final_report.pdf (citing MICHAEL PORTER, THE COMPETITIVE ADVANTAGE OF NATIONS 662–63 (1990)).

46 *Id.*

The impact on the agricultural industry can also be harmful. Antitrust exemptions may adversely affect industries by reducing the incentives to improve products, to reduce costs, or to innovate. "Statutory exemptions from the antitrust laws undermine, rather than upgrade, the competitiveness and efficiency of the U.S. economy," noted the Antitrust Modernization Commission.[47] In its recommendations, the Commission wrote, "statutory immunities from the antitrust laws should be disfavored" and granted only when "necessary to satisfy a specific societal goal that trumps the benefit of a free market to consumers and the U.S. economy in general."[48]

The U.S. Department of Agriculture, by contrast, has written that the Capper-Volstead Act does not increase prices for consumers. In fact, they maintain, because cooperatives have higher returns, prices may decrease and consumers may indirectly "benefit as much or more than producers."[49]

Is this optimistic view borne out? According to plaintiffs in recent cases, it is not. The class action lawsuits filed in recent years—processed egg products,[50] milk,[51] mushrooms,[52] and potatoes[53]—were all premised on the

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47 *Id.*

48 *Id.* at 350.

49 U.S. DEP'T OF AGRIC., COOPERATIVE BENEFITS AND LIMITATIONS: FARMER COOPERATIVES IN THE UNITED STATES: COOPERATIVE INFORMATION REPORT 1 SECTION 3, at 15 (Apr. 1980, reviewed and approved for reprt'ing, May 1990), http://www.rd.usda.gov/files/cir1sec3.pdf.

50 Third Consolidated Amended Class Action Complaint, *In re* Processed Egg Prods. Antitrust Litig., No. 08-MD-02002, 2014 WL 6388436 (E.D. Pa. Nov. 17, 2014) (Plaintiffs alleged that producers conspired to reduce the number of laying hens and to institute reduced numbers of hens per cage, ostensibly for animal welfare, but instead to reduce the production of eggs in order to raise prices).

51 Edwards v. Nat'l Milk Producers Fed'n, No. C 11-04766 JSW, 2014 WL 4643639 (N.D. Cal. Sept. 16, 2014) (quoting Second Amended Consolidated Class Action Complaint) (Plaintiffs alleged that a dairy cooperative required members to pay into a program to prematurely "retire" or slaughter dairy cows and, for some participants, to prohibit their reentry into the industry for at least one year. The plaintiffs asserted that for the period 2003–2010, this production control removed more than 500,000 cows from dairy production, reduced the nation's milk supply by approximately ten billion pounds, and resulted in an increase in the price of raw milk by more than nine billion dollars, with the increase consequently reflected in the price of retail milk.). For a comprehensive discussion, see Peck, *supra* note 36, at 461–62.

52 Revised Consolidated Amended Class Action Complaint, *In re* Mushroom Direct Purchaser Antitrust Litig., No. 06-0620, 2014 WL 5149082 (E.D. Pa. Oct. 14, 2014) (Plaintiffs alleged that an agricultural cooperative sought to reduce competition from non-members by purchasing—and retiring from use—mushroom farms. The cooperative, it was alleged, collected six million dollars in dues and a "Supply Control Assessment," and used half of that amount to purchase four competing mushroom farms and to obtain lease options on two additional farms. The cooperative placed deed restrictions on some farms prohibiting any mushroom production. The U.S. Department of Justice filed a

proposition that agricultural cooperatives engaged in concerted behavior that limited outputs in order to raise revenues, consequently harming buyers who paid higher prices.[54]

Because such cases rarely go to trial, we have little judicial direction on the legality of collusive production restrictions,[55] and we have no publicly available offer of proof on the cost of such collusion. Marketing cooperatives play important roles in many agricultural markets, and "immunity under Capper-Volstead for production restrictions would have a significant impact on future cooperative action."[56] We examine the potato industry to see whether there was evidence that (1) there was collusive behavior demonstrating an agreement to limit production so that there was a common impact on buyers, and (2) whether a reliable estimate can be made of the cost of that collusion on the price of potatoes.

III. ECONOMIC ANALYSES OF EXISTENCE AND EFFECT OF AN AGREEMENT TO LIMIT THE PRODUCTION OF POTATOES

As the first part of the economics analysis, we examine whether there was collusive behavior demonstrating an agreement to limit production of potatoes so that there was a common impact on buyers. We then analyze the economic effect on buyers.

Industry Background

Potatoes are the leading vegetable crop in the United States, accounting for approximately fifteen percent of farm sales receipts for vegetables.[57] From 1988–2008 wheat flour was the most important product in United States food consumption; potatoes were second.[58] The USDA notes that

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complaint against the cooperative and, in a settlement entered as final judgment, the cooperative agreed to remove all deed restrictions. Plaintiffs in the civil suit alleged that the production control caused prices to rise at least 8% as a result of the cooperative's conduct.).

53 *In re* Fresh & Process Potatoes Antitrust Litig., 834 F. Supp. 2d 1141, 1148 (D. Idaho 2011).

54 *See* Peck, *supra* note 36.

55 One administrative decision concluded that the Capper-Volstead Act likely did not exempt collusive production controls from antitrust law. *See* Cent. Cal. Lettuce Producers Corp., 90 F.T.C. 18 (1977).

56 Bender, *supra* note 13 (referring to the dairy industry).

57 U.S. DEP'T OF AGRIC., VEGETABLE & PULSES – POTATOES (Oct. 2016), http://www.ers.usda.gov/topics/crops/vegetables-pulses/potatoes.aspx.

58 Yuliya Bolotova et al., *Is Stabilization of Potato Price and Supply Effective? Empirical Evidence*

"[u]nlike most produce crops, which are perishable, potatoes are well-suited for long-term storage in climate-controlled rooms or containers."[59] A summary of potato growing yields and revenues is attached in Appendix A.

A. Economic Analysis of Existence of Collusive Agreement

An agreement in restraint of trade violates the Sherman Act.[60] In examining whether there is economic evidence of such an agreement in the potato industry, first, we examine those factors necessary for a group to organize to control output so as to raise prices. Next, we look at the existence of monitoring and penalties for violations of an agreement to collude.

1. Factors Facilitating an Agreement to Collude

Economists have identified several factors that affect the ability of firms to establish and maintain collusive agreements.[61] "[F]irst, selecting and coordinating the behavior of all cartel participants on mutually consistent, collusive strategies; second, monitoring the behavior of cartel participants to detect and deter defections from these collusive strategies; and third, preventing entry (or expansion) by non-cartel firms."[62] Industry concentration makes collusion easier by simplifying coordination and increasing gains.[63] Successful cartels in unconcentrated industries generally rely on the coordinating efforts of industry organizations.[64] The potato farming industry is unconcentrated;[65] industry groups, therefore, constitute an important vehicle in coordinating the behavior among the many growers. "[T]rade associations and industry publications that report detailed market

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from Idaho 3 (Univ. of Idaho 2008), http://ssrn.com/abstract=1128746.

59 ECON. RESEARCH SERV., U.S. DEP'T OF AGRIC., POTATOES: SEASONAL PRODUCTION (Oct. 2016), http://www.ers.usda.gov/topics/crops/vegetables-pulses/potatoes.aspx#seasonal.

60 15 U.S.C. §§ 1–7 (2012).

61 *See, e.g.*, Margaret C. Levenstein & Valerie Y. Suslow, *What Determines Cartel Success?*, 44 J. ECON. LITERATURE 43, 44 (2006); *see also* Margaret C. Levenstein & Valerie Y. Suslow, *Cartels and Collusion: Empirical Evidence, in* 2 OXFORD HANDBOOK ON INTERNATIONAL ANTITRUST ECONOMICS (Roger D. Blair & D. Daniel Sokol eds., Oxford Univ. Press 2014).

62 Margaret C. Levenstein & Valerie Y. Suslow, *What Determines Cartel Success?*, 44 J. ECON. LITERATURE 43, 44 (2006).

63 *Id.* at 86.

64 *Id.* at 44.

65 Ryan McCormack, IBISWORLD INDUSTRY REPORT OD6043: POTATO FARMING IN THE U.S. 19 (Mar. 2016) (on file with authors).

information are important in facilitating cartel activity"[66] and "cartels can involve a fairly large number of firms. The number of participants in several of the cartels [that the U.S. Department of Justice] prosecuted were surprisingly high."[67] A trade association's effectiveness in influencing price "depends on its ability to keep product off the market."[68] This was the strategy employed by UPGI and UPGA, the cartels in the *Potatoes* case.

The United Potato Growers of Idaho ("UPGI") was formed in November 2004. Within months of its creation, UPGI reported that the organization controlled 85% of the fresh potato growers in Idaho and represented approximately 70% of the fresh potato acres in the country, with a sister organization being formed in Canada.[69] Through coordinating planting, shipments, supply levels, and prices, the organization's CEO observed that "GRI's [grower return index] have risen from $1.56 in April to over $3.16 . . . ."[70]

United Potato Growers of America ("UPGA"), a national association, was formed shortly after UPGI, in March 2005, to "manage national potato supply so as to positively affect grower profitability."[71] In January 2008, the Chairman of UPGA stated: "The goal is to take potatoes to market in an orderly manner so that farmers make a profit" and observed that the UPGA had reduced potato acreage by 20% since 2004.[72] Through UPGA, one member observed, "growers who've historically competed with each other, are now communicating and coordinating supplies for the betterment of the industry as a whole. Growers are taking ownership of their oversupply problem and voluntarily coming together to solve it with supply management . . . ."[73]

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66 William Kolasky, Deputy Assistant Att'y Gen., U.S. Dep't of Justice Antitrust Div., Address Before the ABA Section of Antitrust Law Spring Meeting: Coordinated Effects in Merger Review: From Dead Frenchmen to Beautiful Minds and Mavericks 20 (Apr. 24, 2002).

67 *Id.* at 17.

68 RICHARD J. SEXTON & JULIE ISKOW, FACTORS CRUCIAL TO THE SUCCESS OR FAILURE OF EMERGING AGRICULTURAL COOPERATIVES 32 (Kirby Moulton et al. eds., 1988).

69 Jerry Wright, *CEO's Message*, UNITED FRESH POTATO GROWERS IDAHO (Idaho Falls, ID), June 2005, at 1, 1 (on file with authors).

70 *Id.*

71 UNITED POTATO GROWERS AM., https://web.archive.org/web/20100520043202/http://www.unitedpotatousa.com/about_us (last updated May 20, 2010) (accessed through web archive).

72 Wentworth, *supra* note 3, at 1.

73 Jane Fyksen, '*Agri-Communicator*' *Working to Unite Potato Growers*, AGRI-VIEW (Mar. 23, 2006, 12:00 AM), http://www.agriview.com/news/crop/feature_stories/agri-communicator-working-to-unite-potato-growers/article_046cebe0-9817-5b0e-8a4f-2858f9b12038.html.

UPGA reportedly believed that its actions were legal under the Capper-Volstead Act, explaining to its members that sharing market information and setting prices was the "keystone of rights" granted to cooperatives under the Capper-Volstead Act and noting that regular phone calls amongst participants allowed the organization to create a "price advisory" which the organization posted online.[74] "The result of these calls," the organization noted, "has been a steady, planned, and coordinated lifting of market prices across the country."[75]

2. Effect of Monitoring on Supporting Agreements to Restrict Output

The largest challenges cartels face is noncompliance, which they characterize as "cheating."[76] Successful production limitations must therefore involve monitoring members to prevent or punish noncompliance.[77] As Professors Levenstein and Suslow note:

> [C]artels use a range of punishment mechanisms to deter cheating, including both "price wars" and side payments, successful cartels do not simply rely on ex post punishments. Instead, they invest in monitoring mechanisms, such as joint sales agencies or regular reporting to one another or third parties. Cartels much prefer to develop the means to monitor each other's behavior in order to deter or physically prevent cheating, rather than resorting to expensive punishments such as price wars.[78]

"[V]olume restrictions must be made binding to accomplish their intended goal" advised one academic foundation, because "[v]oluntary programs will be rendered ineffective by free riders."[79]

There was reportedly extensive monitoring in the potato industry. The UPGA Marketing Committee conducted regular conferences to monitor and set minimum prices for potatoes.[80] The UPGI and UPGA monitored

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74 *Marketing Committee Implements Conference Calls*, UNITED FRESH POTATO GROWERS IDAHO (Idaho Falls, ID), June 2005, at 2, 2 (on file with authors).

75 *Id.*

76 *See, e.g.*, Levenstein & Suslow, *supra* note 62, at 44.

77 *See id.*

78 *Id.*

79 SEXTON & ISKOW, *supra* note 68, at 32.

80 Matt Jenkins, *The Sultans of Spuds – Battered by Their Own Success, Farmers Form the 'OPEC of Potatoes,'* HIGH COUNTRY NEWS, Aug. 20, 2007, at 3–4.

production using "Planting Intention Forms" against which actual production was compared. UPGI and UPGA used governmental materials to determine acreage. The farms were then inspected using on-site and aerial monitors.[81] Plaintiffs in the *Potatoes* case alleged that UPGA used additional methods to monitor the participation of its members, including satellite imagery, GPS systems, fly-overs, as well as having surprise audits and inspections of members' farms.[82] UPGA also allegedly required that members allow UPGA board members access to confidential farm subsidy information so that UPGA could ensure that members were complying with its supply restrictions.[83] Any member who violated the agreement was subject to a $100 per acre fine.[84] Furthermore, non-members were allegedly coerced into joining the agreement as they were considered to be "free-riding" from the benefits of the conspiracy, but without reducing their supply.[85] The monitoring efforts proved successful. "In 2006, the fields of 25% of the general membership and of 100% of the Board members were audited, which represented 65% of the United's fresh potato acres. All the audited fields were in compliance with the rules of the acreage reduction and bid buy-down programs."[86]

B. Economic Analysis of Effect of Collusive Agreement

While it is clear that the potato cooperatives entered agreements to restrict output so as to raise prices, the next question is whether the cooperatives' efforts achieved that result. Based on the cooperatives' own observations, their agreement to reduce growing acreage did, in fact, result in a reduction of potatoes. We survey the economic literature and test these observations with empirical data and analyses.

1. Cooperatives' Observations

By June 2005, UPGA members accounted for 85% of fresh potato acres in Idaho and 70% of fresh potato acres in the United States.[87] In its first year

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81 Yuliya Bolotova et al., *Is Stabilization of Potato Price Effective? Empirical Evidence from the Idaho Russet Burbank Potato Market*, 26 AGRIBUSINESS 177, 184 (2010).

82 Second Amended Class Action Complaint ¶ 325, *In re* Fresh & Process Potatoes Antitrust Litig., No. 4:10-MD-02186-BLW (D. Idaho Jan. 31, 2012), Doc No. 163.

83 *Id.* ¶ 327.

84 *Id.* ¶ 328.

85 *Id.* ¶ 329.

86 Bolotova et al., *supra* note 81, at 184.

87 Wright, *supra* note 69, at 1.

of operation, it had "reduced acreage nationwide by almost 46,000 acres," resulting in "almost a 10M cwt reduction in the Idaho '05 crop and more than 16.3M cwt reduction in the U.S. and Canadian '05 crop."[88] This acreage reduction, the organization reported, resulted in a price increase. To achieve a reduction of 13 million cwt of potatoes in the 2006 crop year, UPGA and its member chapters adopted a comprehensive acreage reduction program of 10% per chapter member with penalties for non-compliance.[89] By 2010, UPGI reported that it had met its acreage reduction obligation, cutting 38% of its members' fresh potato acres.[90]

In March 2006, UPGI reported that "[i]n only its fifth week, United's Supply Management Programs ha[d] raised the Idaho Grower Index by $1.50 – an unprecedented feat."[91] In October 2006, UPGI reported that the monitored results of the production limits showed that the organization was successful in reducing supply.[92] Growers not reducing production within the organization's guidelines were assessed fines.[93] United II[94] members were allegedly required to divert up to three percent of their fresh potatoes, as well

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88 *Id.*

89 Second Amended Class Action Complaint ¶ 260, *In re* Fresh & Process Potatoes Antitrust Litig., No. 4:10-MD-02186-BLW (D. Idaho Jan. 31, 2012), Doc. No. 163.

90 *Id.* ¶ 298.

91 *United's Supply Management Programs Are a Success*, UNITED POTATO GROWERS IDAHO BULL. (Idaho Falls, ID), Mar. 2006, at 1, 1 (on file with authors).

92 *Audits Verify Acreage Cuts*, UNITED POTATO GROWERS IDAHO BULL. (Idaho Falls, ID), Oct. 2006, at 1, 1 (on file with authors).

93 *2007–08 Planting Guidelines*, UNITED POTATO GROWERS IDAHO BULL. (Idaho Falls, ID), Nov. 2006, at 4, 4 (emphasis omitted) (on file with authors):
United's 2007-08 Acreage/Planting Goals[:]
1) Reduce fresh plantings off the 2004 base by 15 percent nationwide.
2) Discourage and eliminate "mindless expansion" beyond the 2004 base acres. . . .
. . . .
The 2007-08 Fresh Acreage Guidelines[:] For the 2007-08 planting season, United Fresh Growers will be given 2 options for acreage control:
Option I: Reduce plantings a full 15 percent off of their 2004 Base. Full execution of this option constitutes a Payment in Kind meaning the grower will owe no cash assessment.
Option II: Growers choosing to reduce acreage LESS than 15 percent will be assessed a pro-rated percentage of the $50.00 fee ON ALL THEIR BASE ACRES. Monies will be used to "buy-out" acres elsewhere within the State.
Growers expanding acres WITHOUT BASE will be assessed $100 per acre on ALL acres (expansion plus base acres). This year's basic acreage assessment will again be $50.00 per base acre. And again, growers who fully implement option I will receive a full credit for a payment-in-kind meaning they will owe NO CASH ASSESSMENT.

94 United II was a cooperative formed of UPGI cooperative members. Second Amended Class Action Complaint ¶ 30, *In re* Fresh & Process Potatoes Antitrust Litig., No. 4:10-MD-02186-BLW (D. Idaho Jan. 31, 2012), Doc. No. 163.

as agree to UPGI's supply management policies.[95] UPGI's programs helped increase fresh potato prices. "From the beginning of the harvest for the 2005 crop to the end of the storage season for the 2007 crop, the Idaho monthly-average price ranged from $5.80 to $9.00."[96]

UPGI employed numerous forms of supply management to fix the prices of fresh and processed potatoes, including its initial efforts of donating potatoes to charitable organizations and imposing "shipping holidays" during which each potato-packing operation would shut down for at least a single shift.[97] UPGI also began the acreage limitations outlined herein, which were eventually adopted and promoted on a nationwide basis.[98] UPGI "helped achieve an increase in the U.S. grower return index from $6.94 in 2006–07 to $8.41 in 2007–08 and then $10.85 in 2008–09."[99]

2. Survey of Economics Literature

Several economics papers have estimated the percentage increase in potato prices caused by the growers' conduct. In a recent study, Professor Bolotova et al. analyzed the prices of Idaho Russet potatoes before and during what they term the "cooperative" period. They conclude that "[a]ll analyzed Russet Burbank weekly shipping point prices are higher in the cooperative period relative to the pre-cooperative period,"[100] with price increases ranging from 14% to 72%.[101] These price increases were statistically significant.[102]

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95 *Id.* ¶ 372–74.

96 Joseph F. Guenthner, *The Development of United Potato Growers Cooperatives*, 26 J. COOPERATIVES 1, 7 (2012).

97 Joseph F. Guenthner, *Gaining Market Power Through Grower Consolidation, Intellectual Property Rights and Human Capital*, *in* FARM CREDIT HORIZONS: PERSPECTIVES ON THE AMERICAN FOOD, FIBER AND BEVERAGE INDUSTRY 7–8 (2005).

98 *United's Programs Keep Spud Acreage in Check*, UNITED POTATO GROWERS IDAHO BULL. (Idaho Falls, ID), Aug. 2006, at 2, 2 (on file with authors).

99 *Q and A with Dr. Richard Sexton, UC, Davis*, UNITED POTATO GROWERS AM. (Apr. 26, 2010), http://web.archive.org/web/20100520020713/http://www.unitedpotatousa.com/publications_and_news.

100 Bolotova et al., *supra* note 81, at 186.

101 *Id.* at 186–89.

102 Christopher S. McIntosh et al., *Controlling Potato Supply and Price Volatility – Does it Work? Empirical Evidence from Idaho*, UNIV. OF IDAHO (2008), http://ageconsearch.umn.edu/bitstream/37767/2/AAEA%202008%20Poster%20Controlling%20Potato%20Supply%20and%20Price%20Volatility%20%20Does%20It%20Work.pdf; *see also* Yuliya Bolotova et al., *Price Volatility of Idaho Fresh Potatoes: 1987–2007*, 85

Bolotova et al. further analyzed the impact of the UPGI's acreage management program on fresh potato prices.[103] Their research found that Idaho monthly fresh potato prices rose between 54% and 60%, net of production cost increases in the cooperative period relative to the pre-cooperative period, and that "the impact of [UPGI] is likely to be the most significant factor explaining the observed price increase."[104] They found similar results at the national level, as U.S. monthly fresh potato prices rose 31% in the cooperative period relative to the pre-cooperative period, noting that other potato growing regions began "following similar strategies," and that the increase in U.S. prices likely reflected the "effects of the [UPGI] and cooperatives with similar objectives."[105]

Other researchers have also pointed to UPGA's success in imposing acreage limitations and controlling production volume that resulted in higher prices as well as increased price stability.[106] One study found that compared with pre-collusion planting, monthly fresh potato prices were 70% higher. Because 10% to 16% of the price rise could be attributed to higher production costs, 54% to 60% of the price increase was due to other factors, presumably the activities of UPGA.[107]

3. Empirical Analysis

As noted, the cooperatives and others reported on the existence and success of agreements to control the output of potato crops. We examine the economic consequences of the collusive agreements. To analyze whether these observations are empirically borne out, we use the "Before-During"

AM. J. POTATO RES. 438, 441 (2008) (finding higher potato prices and lower price volatility in the cooperative period and mixed results on their statistical significance).

103 Yuliya Bolotova et al., *The Impact of Coordination of Production and Marketing Strategies on Price Behavior: Evidence from the Idaho Potato Industry*, 11 INT'L FOOD & AGRIBUSINESS MGMT. REV. 1, 15 (2008).

104 *Id.* at 25–26.

105 *Id.* at 26.

106 Guenthner, *supra* note 96, at 7–9 (observing, among other things, that Idaho potato plantings declined 8.5% from 2004–2005, while yields production decreased 10.4%. For the period 2005–2007, Idaho plantings decreased from 415,000 (in 2000) to 325,000–350,000 for the 2005–2007 crops. "The 2008 crop," Professor Guenthner noted, "brought more excitement as Idaho growers reduced plantings by 13%."); *see also* Shermain D. Hardesty, *Enhancing Producer Returns: United Growers of America*, 9 AGRIC. & RESOURCE ECON. UPDATE 9, 11 (2008) ("Monthly average prices received by Idaho growers in the fresh market are higher and noticeably more stable than before UPGA's implementation of supply controls in Fall 2005.").

107 Bolotova et al., *supra* note 103, at 25–26.

method to analyze whether buyers paid higher prices as a result of the alleged agreement than they would have but-for that agreement.[108] To do so, we compare potato prices in a time period before the alleged conspiratorial conduct to prices during the conspiratorial conduct, holding a number of economic factors constant. In particular, we implement the Before-During methodology by analyzing supply and demand conditions and applying multivariate regression analyses.

a. Effect of Demand Elasticity in Restricting Output

From an antitrust perspective, a price-fixing agreement that raises the price of a product with an inelastic demand would be expected to cause a common impact on buyers. When demand for the product is inelastic, relatively few buyers will stop buying the product in response to the anticompetitive price increase and, thus, would be commonly affected. In particular, because demand for the product is inelastic, relatively few buyers will switch their purchases to other products. When demand for a product is inelastic, it is a demonstration that consumers do not regard other products as reasonably interchangeable.[109]

For a cartel to be effective, it must be able to sustain supra-competitive prices. The elasticity of demand for a product shows by how much the quantity demanded falls in response to a given increase in price. In particular, the elasticity of demand equals the percentage change in quantity divided by the percentage change in price.[110] The empirical results of the peer-reviewed research show that the elasticity of demand for potatoes is "inelastic," i.e., less than 1.0 in absolute value. This means that a given percentage increase in price results in a smaller percentage reduction in quantity demanded. Our analysis, contained in Appendix B, demonstrates that the demand elasticity for potatoes is "inelastic," i.e., less than 1.0 in absolute value.

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108 *See, e.g.*, AM. BAR ASS'N SECTION OF ANTITRUST LAW, ECONOMETRICS: LEGAL, PRACTICAL, AND TECHNICAL ISSUES 312 (Lawrence Wu ed., 2d ed. 2014) [hereinafter ABA ANTITRUST] ("The before-during approach identifies the effect of the alleged conduct by using data from a period before the alleged conduct in combination with data from the period when the alleged conduct occurred. Comparing the values of the dependent variable in the before period to the values it took on in the during period may serve to identify the effect of the alleged conduct.").

109 *See* B. DOUGLAS BERNHEIM & MICHAEL D. WHINSTON, MICROECONOMICS § 2.4 (McGraw-Hill Irwin, 1st ed. 2008).

110 *See, e.g.*, *id.*

All else being equal, firms operating in markets with inelastic and stable demands can more easily establish and maintain price-fixing agreements.[111] The fact that the demand for potatoes is inelastic both (1) facilitates the cartels' ability to establish and maintain the alleged agreement and (2) demonstrates that the alleged agreement would likely cause a common impact on all buyers. We next analyze the economic effect of this agreement.

b. Regression Model

We implement the Before-During methodology by using a standard multivariate regression analysis to estimate the prices that buyers would have paid but-for the alleged agreement. Determining the common impact, if any, attributable to allegedly collusive behavior generally involves analyzing differences in prices. Two periods are typically identified. First, a damages or impact period is defined as the period in which the alleged collusion occurred. Second, a benchmark or control period is defined as the period in which the alleged collusion did not occur; as such, prices in this period are likely unaffected by the alleged collusion. The difference between prices in the damages period and the benchmark period is commonly referred to as the overcharge. In order to isolate the impact, if any, attributable to the alleged collusion from other non-collusive factors, e.g., changes in costs and demand, multivariate regression analysis is commonly used.[112] For the analysis, see Appendix C.

C. Calculation of Damages

From an economic perspective, antitrust damages equal the difference between the price buyers paid in the actual world and the price they would have paid but-for the alleged agreement, multiplied by the quantity purchased by buyers.

The dummy-variable regression model utilizes common evidence to estimate the prices that buyers would have paid but for the alleged agreement. Application of the standard dummy-variable regression model at the shipping point level shows an average nationwide overcharge attributable to the alleged collusion of 30.0% for fresh potatoes and 48.7% for Russet potatoes. Application of the standard dummy-variable regression model at the wholesale level shows an average nationwide overcharge attributable to the

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111 Levenstein & Suslow, *supra* note 62, at 63–64 (footnotes omitted).

112 *See, e.g.*, ABA ANTITRUST, *supra* note 108, at 301, 355–70.

alleged collusion of 24.4% for fresh potatoes and 36.5% for Russet potatoes. This analysis is contained in Appendix D.

IV. CONCLUSION

An unclear statutory scheme and a lack of adjudicated cases have left agricultural producers uncertain about the legality of coordinated production limitations under the Capper-Volstead Act. While the practice remains extant—at significant cost to consumers—there appears to be little legislative will to clarify whether the practice is legal. As shown in the case of the potato industry, coordinated production caps have significantly increased the cost to buyers.

There seems little doubt that the Capper-Volstead Act does not exempt agricultural producers from antitrust law. Arguing that collusion is permitted under the fiction that it falls within the meaning of the term "marketing" is contrary to the Act's legislative purpose. The Capper-Volstead Act was intended to encourage competition by allowing farmers—often isolated and dispersed small businesses—to engage in collective conduct so as to protect themselves from the predatory behavior of the more consolidated intermediary buyers. That is, the Act's purpose was to foster competition, and not to allow farmers to collusively thwart competition by restricting production. Such restriction violates both the antitrust statutes' and the Capper Volstead Act's goal of having fair and competitive markets when competitors can collude to set production limits. Exemptions to antitrust law, it has often been noted, must be narrowly construed. There is no reason to permit this form of market-rigging, particularly when the social welfare costs are so high.

APPENDIX A

There are two primary categories of potatoes: fresh and process. According to the USDA, the primary category of potatoes consumed in the United States historically was fresh potatoes.[113] However, the use of fresh potatoes has declined since the 1950s when French fries and other processed potato products rose in popularity.[114] Table 1 shows the percentage of potatoes produced by category in the U.S. for the period 2004–2012.

TABLE 1: PERCENTAGE OF POTATOES PRODUCED BY CATEGORY

Type	2004	2005	2006	2007	2008	2009	2010	2011	2012
Fresh	28.6	26.9	25.7	24.9	26.3	26.9	26.6	23.9	25.6
Process	56.7	59.5	60.8	62.2	61.1	59.1	61.0	63.4	61.2
Others	5.5	5.7	5.7	5.3	5.2	6.2	5.2	5.3	6.0
Non-Sales	9.3	7.9	7.8	7.6	7.4	7.8	7.2	7.4	7.2
Total	100.	100.	100.	100.	100.	100.	100.	100.	100.

Data source: NAT'L AGRIC. STATISTICS SERV., U.S. DEP'T OF AGRIC., POTATOES ANNUAL SUMMARY (2004–2012), http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1123.

Figure 1 shows USDA data for annual sales of fresh potatoes for the years 1994–2012 in centum weight ("cwt").[115] As is evident in the figure, average annual sales of fresh potatoes in the pre-collusion period 1998–2004 were substantially higher than in the collusion period 2005–2012.

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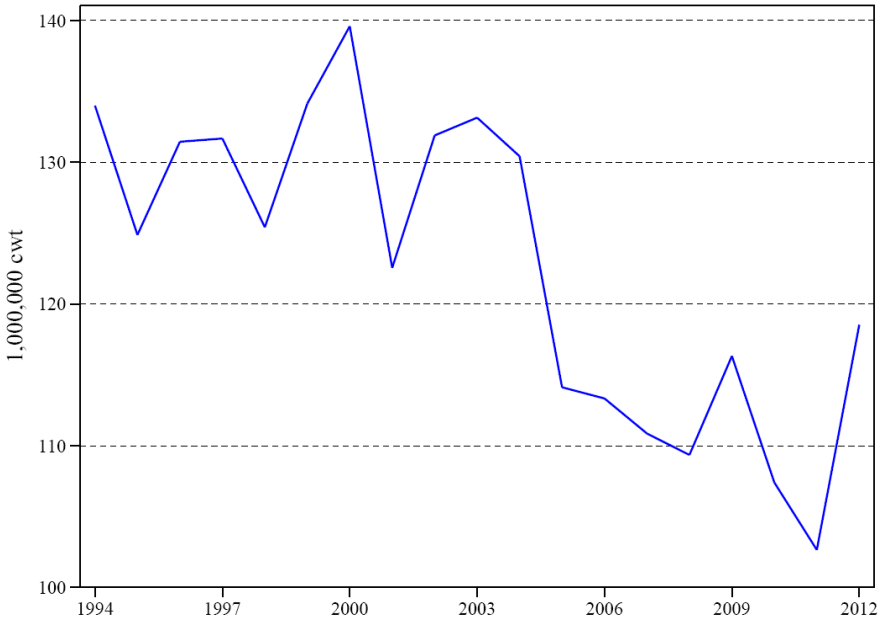
113 U.S. DEP'T OF AGRIC., VEGETABLE & PULSES – POTATOES (Oct. 2016), http://www.ers.usda.gov/topics/crops/vegetables-pulses/potatoes.aspx.

114 *Id.*

115 1 cwt (centrum weight) equals 100 pounds.

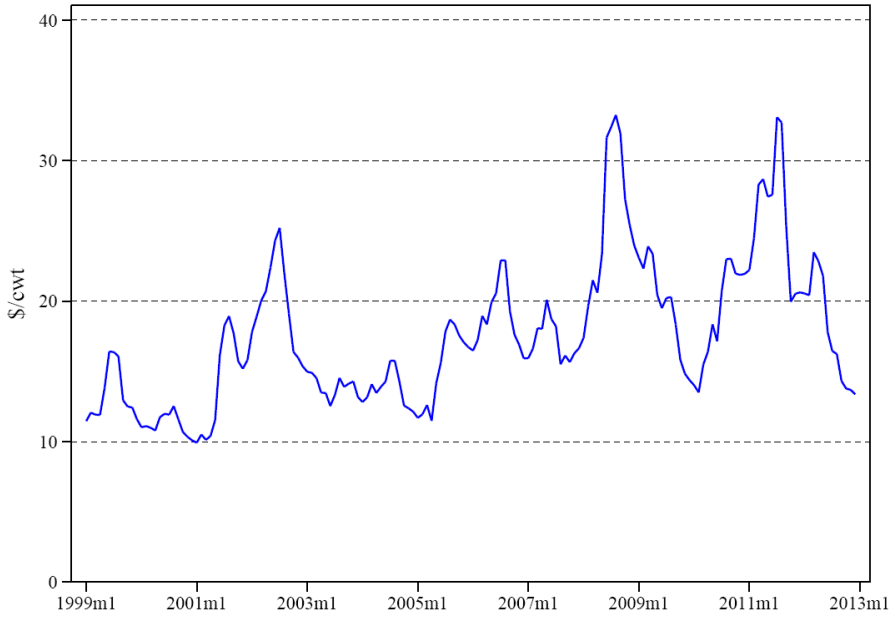
FIGURE 1: U.S. FRESH POTATO UTILIZATION: 1994–2012



Data source: NAT'L AGRIC. STATISTICS SERV., U.S. DEP'T OF AGRIC., POTATOES ANNUAL SUMMARY (1994–2012), http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1123.

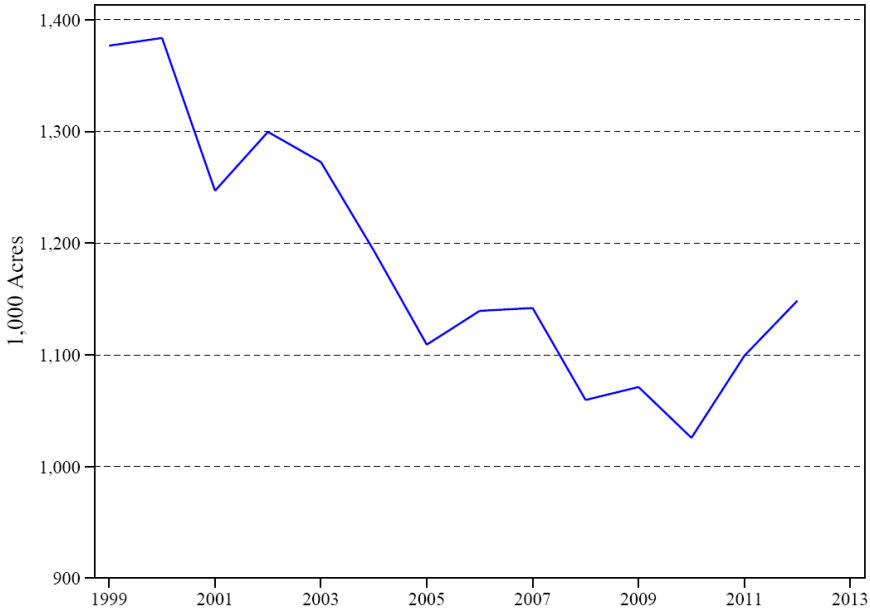
Figure 2 shows the U.S. average monthly price of fresh potatoes over the period 1999–2012. Figure 3 shows U.S. potato acreage planted over the period 1999–2012. As is evident in the two figures, the decline in total acreage of potatoes planted generally corresponds with higher prices of fresh potatoes in the period 2005–2012 than in earlier years.

FIGURE 2: U.S. AVERAGE MONTHLY PRICE OF FRESH POTATOES: 1999–2012



Data source: U.S. DEP'T OF AGRIC., SHIPPING POINT REPORTS: POTATOES (1998–2014), https://www.marketnews.usda.gov/mnp/fv-report-config-step1?type=shipPrice.

FIGURE 3: U.S. POTATO ACREAGE PLANTED: 1999–2012



Data source: NAT'L AGRIC. STATISTICS SERV., U.S. DEP'T OF AGRIC., POTATOES ANNUAL SUMMARY (1999–2012), http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1123.

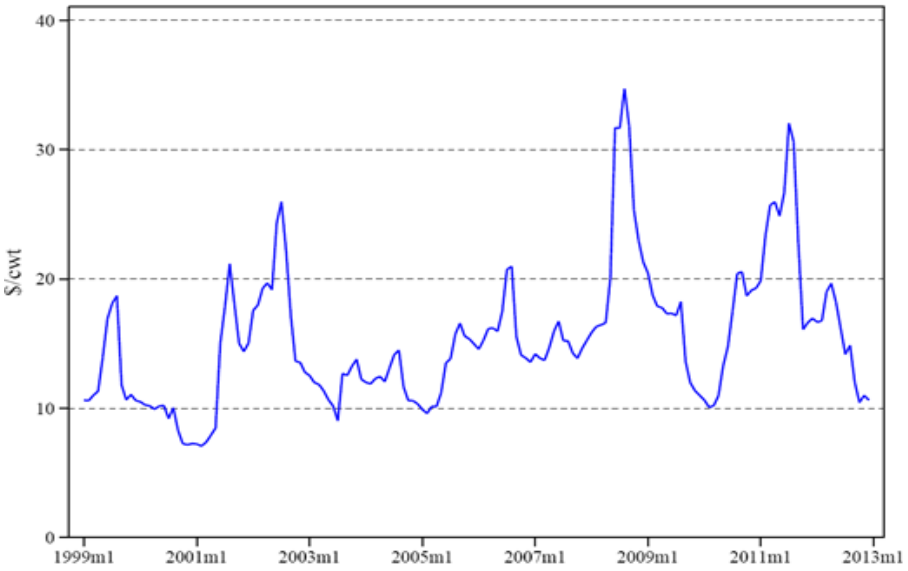
The USDA reports data on several different varieties of potatoes: Russet, Red, White, and Yellow. In 2012, Russet potatoes accounted for approximately 73% of U.S. potato acreage planted in the fall season.[116] The corresponding percentages for major Russet producing states are Idaho (91%), Washington (87%), Colorado (88%), and Oregon (80%).[117] Figure 4 shows the U.S. average monthly price of Russet potatoes over the period 1999–2012. Figure 5 shows the fall acreage planted for Russet potatoes over the period 2003–2012, which covers all the available USDA data. As is evident in the two figures, the decline in fall acreage planted of Russet

116 NAT'L AGRIC. STATISTICS SERV., U.S. DEP'T OF AGRIC., POTATOES 2012 SUMMARY 21 (Sept. 2013), http://usda.mannlib.cornell.edu/usda/nass/Pota//2010s/2013/Pota-09-19-2013.pdf.

117 *Id.*

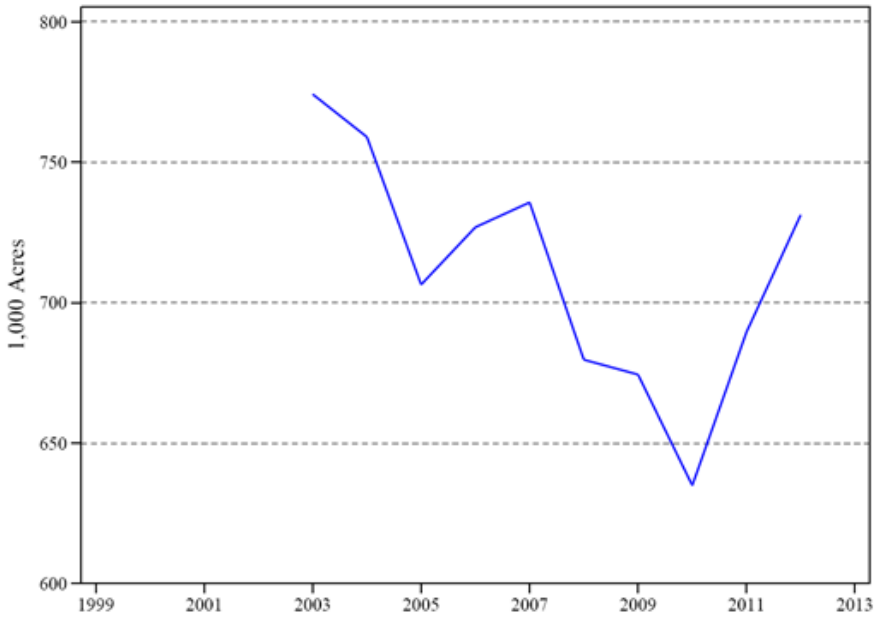
potatoes generally corresponds with higher prices in the period 2005–2012 than in earlier years.

FIGURE 4: U.S. AVERAGE MONTHLY PRICE OF RUSSET POTATOES: 1999–2012



Data source: U.S. DEP'T OF AGRIC., SHIPPING POINT REPORTS: POTATOES (1998–2014), https://www.marketnews.usda.gov/mnp/fv-report-config-step1?type=shipPrice.

FIGURE 5: U.S. FALL RUSSET POTATO ACREAGE PLANTED: 2003–2012



Data source: NAT'L AGRIC. STATISTICS SERV., U.S. DEP'T OF AGRIC., POTATOES ANNUAL SUMMARY (2003–2012), http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1123.

Table 2 shows the fall Russet potato acreage planted by state for the period 2003–2012.

TABLE 2: FALL RUSSET POTATO ACREAGE PLANTED BY STATE (1,000 ACRES)

State	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
ID	342.0	337.3	308.8	314.9	329.0	286.7	297.6	271.4	294.4	314.0
WA	138.6	140.8	134.0	134.2	136.0	133.3	116.0	114.8	142.4	143.6
CO	55.0	53.3	49.5	50.3	48.5	48.5	47.0	47.2	47.0	48.5
ND	48.0	46.2	38.6	47.0	47.5	41.0	34.9	34.4	32.8	35.2
WI	42.1	40.5	38.8	37.6	36.1	38.1	34.9	32.5	32.1	33.5
MN	36.6	31.0	30.4	35.0	33.8	33.5	31.0	30.2	32.8	33.3
OR	30.8	27.4	31.3	28.4	27.4	26.1	30.3	27.0	31.2	33.6
ME	26.4	27.9	27.0	26.9	25.7	29.1	28.6	28.1	30.8	31.6
MI	6.0	5.6	6.5	6.5	5.1	4.7	7.7	4.8	5.9	5.6
NY	-	1.0	1.0	1.0	0.2	0.2	0.2	0.3	0.3	0.5
PA	-	-	-	-	0.3	0.1	0.1	0.2	-	0.4
U.S.	774.2	759.0	706.4	726.9	735.7	679.7	674.4	635.0	689.5	731.2

Note: State acreages do not sum to U.S. acreage because the USDA does not report acreage planted data for all states.

Data source: NAT'L AGRIC. STATISTICS SERV., U.S. DEP'T OF AGRIC., POTATOES ANNUAL SUMMARY (2003–2012), http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1123.

APPENDIX B

The elasticity of demand, ϵ, equals the ratio of the percentage change in quantity, $\Delta Q/Q$, over the percentage change in price, $\Delta P/P$. Table 3 provides several examples of the elasticity of demand. The table shows, for example, that if the quantity supplied of a product falls by 1% and the elasticity of demand equals -0.5, then the price will rise by 2%.

TABLE 3: ELASTICITY OF DEMAND:
PERCENTAGE INCREASE IN PRICE CAUSED BY A ONE PERCENT
REDUCTION IN QUANTITY

Elasticity	-0.10	-0.25	-0.50	-0.75	-1.00
Percentage increase in price	10.0	4.0	2.0	1.3	1.0

Thus, given an estimated price elasticity from the literature and a percentage reduction in the quantity of fresh potatoes caused by the agreement, the percentage price increase is calculated as follows:

$$(P_{cartel} - P_{butfor})/P_{butfor} = [(Q_{cartel} - Q_{butfor})/Q_{butfor}]/\epsilon = (Q_{cartel} - Q_{butfor})/(\epsilon \cdot Q_{butfor})$$

Table 4 presents a list of estimated price elasticities for potatoes published in the economics literature. As demonstrated in the table and Figure 6, the estimated price elasticities range from -0.52 to -0.10. For example, UPGA has concluded that a reduction in potato supply of 1% resulted in a price increase of 7%, i.e., a demand elasticity of -0.14 as set forth in the table below.[118] These results show that the demand elasticity for potatoes is "inelastic," i.e., less than 1.0 in absolute value. The research papers cited in the table employ different estimation methodologies and different data sets, yet show a consistent finding of robust inelastic demand for potatoes.

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118 *See, e.g.*, Joseph F. Guenthner, *Potato Growers Can Keep Profitable Prices by Thinking of the Industry First*, AGRIC. ECON. EXTENSION SERIES no. 09-02 at 2 (Univ. of Idaho 2009) ("For each 1 percent change in supply, prices change 7 percent in the opposite direction.").

FIGURE 6: ABSOLUTE VALUE OF ESTIMATED ELASTICITY

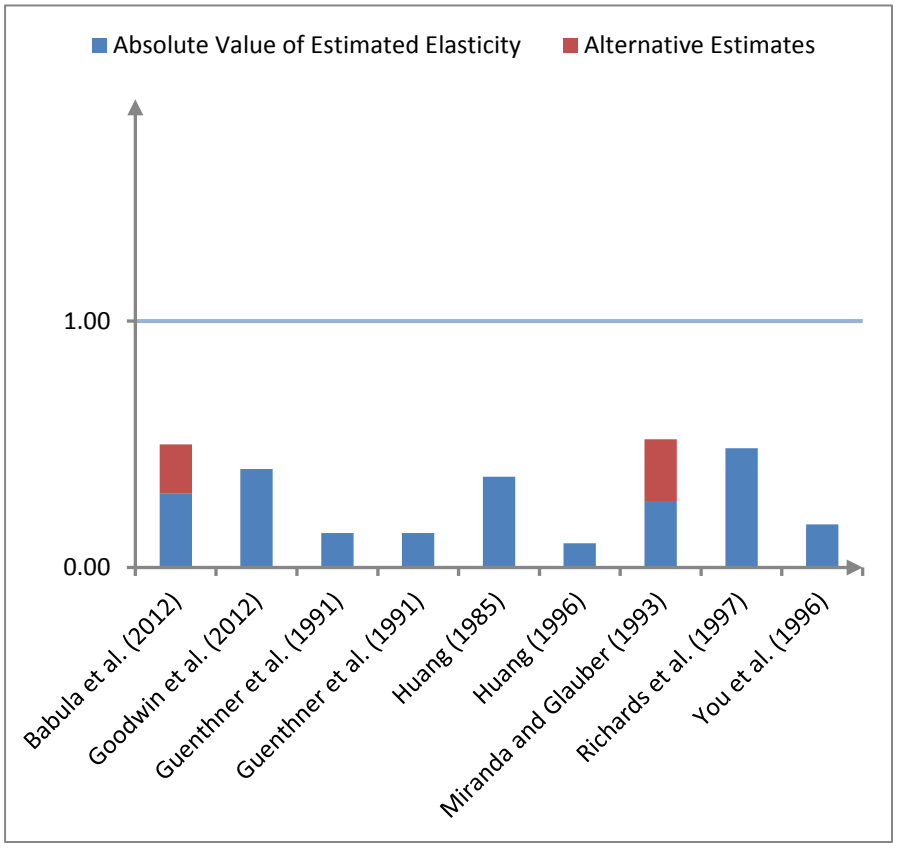

TABLE 4: ESTIMATED PRICE ELASTICITY IN THE LITERATURE

Research Paper	Variety	Region	Period	Vertical Level	Model and Methodology	Estimated Elasticity
Babula et al. (1998) /1	Fresh	U.S.	1987–1996	Retail	Monthly vector autoregression model	-0.50 to -0.30
Goodwin et al. (2012) /2	Fresh	Eastern Idaho	2000–2010	Grower	OLS inverse demand function regression	-0.40
Guenthner et al. (1991a) /3	Fresh	U.S.	1970–1988	Retail	OLS or GLS regression	-0.14
Guenthner et al. (1991b) /4	Fresh	U.S.	1970–1988	Retail	OLS or GLS regression	-0.14
Huang (1985) /5	All potatoes	U.S.	1953–1983	Retail	Estimating a demand system of potatoes and other food items and one non-food item using constrained maximum likelihood method	-0.37
Huang (1996) /6	All potatoes	U.S.	1953–1990	Retail		-0.10
Miranda & Glauber (1993) /7	All potatoes	U.S.	1978–1989	Grower	Structural model of intraseasonal potato demand	-0.52 to -0.27
Richards et al. (1997) /8	Fresh	U.S.	1970–1991	Retail	Linear approximation almost ideal demand system	-0.48
You et al. (1996) /9	All potatoes	U.S.	1960–1993	Retail	Composite demand system	-0.18

Notes:

/1 Ronald A. Babula et al., *Econometric Examination of U.S. Potato-Related Market Relationships: Findings from a Recent U.S. Trade Investigation*, 9 J. INT'L FOOD & AGRIBUSINESS MARKETING 35, 35, 56 (1998).

/2 W. Goodwin, *Economic Impacts of Increasing the Minimum Size for Idaho Fresh Potatoes*, 43 J. FOOD DISTRIBUTION RES. 30 (2012).

/3 Joseph F. Guenthner et al., *The Influence of Microwave Ovens on the Demand for Fresh and Frozen Potatoes*, 22 J. FOOD DISTRIBUTION RES. 45 (1991).

/4 Joseph F. Guenthner et al., *Factors that Affect the Demand for Potato Products in the United States*, 68 AM. POTATO J. 569 (1991).

/5 Kuo S. Huang, *U.S. Demand for Food: A Complete System of Price and Income Effects* (Econ. Res. Serv., USDA ed. 1985).

/6 Kuo S. Huang, *Nutrient Elasticities in a Complete Food Demand System*, 78 AM. J. AGRIC. ECON. 21 (1996).

/7 Mario J. Miranda & Joseph W. Glauber, *Intraseasonal Demand for Fall Potatoes Under Rational Expectations*, 75 AM. J. AGRIC. ECON. 104 (1993).

/8 Timothy Richards et al., *Factors Influencing Changes in Potato and Potato Substitute Demand*, 26 AGRIC. & RESOURCE ECON. REV. 52 (1997).

/9 Zhikang You et al., *A Composite System Demand Analysis for Fresh Fruits and Vegetables in the United States*, 27 J. FOOD DISTRIBUTION RES. 11 (1996).

Table 5 presents percentage price increases given the estimated price elasticities in the literature and different percentage reductions in the supply of potatoes caused by the alleged agreement.

TABLE 5: ESTIMATED PERCENTAGE INCREASE IN THE BUT-FOR PRICE OF POTATOES CAUSED BY THE ALLEGED AGREEMENT

Percentage Reduction in Quantity Supplied	Own Price Elasticity			
	-0.14	-0.30	-0.40	-0.50
2	14.3	6.7	5.0	4.0
5	35.7	16.7	12.5	10.0
8	57.1	26.7	20.0	16.0
10	71.4	33.3	25.0	20.0
13	92.9	43.3	32.5	26.0
15	107.1	50.0	37.5	30.0

Using the elasticity formula described above, the percentage reduction of 2.36% in quantity supplied resulting from the acreage restriction program implies price increases ranging from 4.7% to 16.8%. Including the effect of the "secondary" marketing strategies, the percentage reduction of 3.96% in quantity supplied implies price increases ranging from 7.9% to 28.3%. These percentage price increases are conservative because UPGI's actions primarily reduced the production of fresh potatoes.

In 2005, fresh potatoes constituted 26.9% of total U.S. potato production (see Table 1). The percentage reduction of 2.36% in quantity supplied resulting from the acreage restriction program implies price increases for fresh potatoes ranging from 17.5% to 62.6%. Including the effect of the "secondary" marketing strategies, the percentage reduction of 3.96% implies price increases ranging from 29.5% to 105.2%. These percentage price reductions are conservative because they only account for the acreage reduction in Idaho—not the entire U.S.

APPENDIX C

In the present context, a multivariate regression analysis consists of a model (i.e., an equation) that explains variation in prices with explanatory factors that affect price. The regression model analyzes prices during the benchmark period and the damages period in order to calculate what the prices would have been in the absence of the alleged collusion (i.e., but-for prices). The model is then used to compare but-for prices to the prices buyers actually paid in the damages period. This comparison of but-for and actual prices serves to identify the effects, if any, of the alleged collusion. In particular, the comparison provides a basis both for identifying whether prices were increased by allegedly collusive behavior (i.e., whether common impact exists), and, if so, to what extent (i.e., quantifying damages).

We specify a regression model that relates the equilibrium price of potatoes to potato demand and supply factors as well as a "dummy variable." A dummy variable in a regression model is a variable that equals either 0 or 1. For example, in the current case, the dummy variable equals 0 in the benchmark or control period and 1 in the damages or impact period. This standard approach has been described by Professors McCrary and Rubinfeld as follows: "One standard approach to the evaluation of overcharges estimates a regression model for the entire period for which data are available, and evaluates damages by looking at the statistical significance and magnitude of the coefficient on a dummy variable that distinguishes the impact period from the control period."[119]

Regression dummy variable models have been widely used in antitrust cases to determine common impact.[120] The model is estimated using data from both the benchmark and damages periods. The dummy variable measures the effect, if any, of the alleged collusion on prices after accounting for (i.e., holding constant), the effects of the other explanatory variables on price. If there are systematic differences between prices in the benchmark and damages periods not accounted for by the other explanatory variables, those differences are attributable to the alleged collusion and will be measured by the dummy variable.

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[119] Justin McCrary & Daniel L. Rubinfeld, *Measuring Benchmark Damages in Antitrust Litigation*, 3 J. ECONOMETRIC METHODS 63, 65 (2014).

[120] *See, e.g.*, ABA ANTITRUST, *supra* note 108, at 370; Kevin W. Caves & Hal J. Singer, *Econometric Tests for Analyzing Common Impact*, *in* THE LAW AND ECONOMICS OF CLASS ACTIONS 135 (James Langenfeld ed., 2014); Daniel L. Rubinfeld, *Quantitative Methods in Antitrust*, *in* ABA ANTITRUST SECTION, ISSUES IN COMPETITION LAW AND POLICY 723, 724–25 (2008).

The benchmark period in a particular regression depends on the availability of data and the likelihood that the period was free of the alleged collusive behavior. For regressions using USDA data, the benchmark period is September 1998 through September 2005.

Using September 1998 through September 2005 as the benchmark period is conservative. There is economic evidence that the cooperatives colluded to restrict the output of potatoes during that period. As a result, the benchmark period of September 1998 through September 2005 likely includes prices affected by collusive conduct. This inclusion of collusive prices in the benchmark period has the effect of reducing the percentage reduction in but-for prices below actual prices as determined by the dummy-variable regression model. Thus, the estimated but-for prices are more conservative than they otherwise would be in the absence of such collusion during the benchmark period.[121] Regarding the end date of the damages period, we use December 2012. We assume that the effects of the 2011–2012 crop year acreage reduction agreements would have dissipated by the end of calendar year 2012. Finally, altering any of the starting and ending dates for the benchmark and damages periods would not involve any change in the regression methodology or data.

We use data from the benchmark and damages periods to estimate the following regression model:

$$\ln(P_t) = \alpha + \beta X_t + \gamma D_t + \varepsilon_t, \qquad (1)$$

where $\ln(P_t)$ denotes the natural logarithm of the price of fresh or Russet potatoes at either the shipping point or wholesale levels; X_t is a set of variables consisting of demand and supply factors; D_t is a dummy variable that equals 1 during the conduct period and 0 otherwise; and ε_t is the regression error term.[122] The symbols α, β, and γ denote the regression coefficients.[123] Table 6 describes the variables and presents their summary statistics.

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121 "Although the United was formally organized in November 2004, we consider that fresh potato prices did not start reflecting the effects of its programs until October 2005, when a new marketing season started. The first acreage reduction program was implemented during the spring 2005 potato planting season. This explains our decision on using October 2005 as a date distinguishing the precooperative and cooperative periods." Bolotova et al., *supra* note 81, at 186.

122 *See* McCrary & Rubinfeld, *supra* note 119, at 64.

123 In particular, β is a set of regression coefficients.

TABLE 6: SUMMARY STATISTICS FOR VARIABLES IN REGRESSION ANALYSIS

Variable	Units	Definition	Median	Mean	Std. Dev.	Min	Max
Dependent variables							
Fresh price (Shipping Point)	$/cwt	Monthly average of USDA average high and low daily prices	16.39	17.43	5.19	9.92	33.24
Russet price (Shipping Point)	$/cwt	Monthly average of USDA average high and low daily prices	14.53	15.31	5.32	7.08	34.71
Fresh price (Wholesale)	$/cwt	Monthly average of USDA average high and low daily prices	28.47	29.36	7.32	18.74	50.80
Russet price (Wholesale)	$/cwt	Monthly average of USDA average high and low daily prices	24.95	25.70	7.23	14.11	48.75
Independent variables							
Conduct control							
Impact	0/1	10/2005 – 12/2012	1	0.51	0.50	0	1
Demand controls							
Food away	%	Ratio of annual average food away expenditures to food at home expenditures	72.21	72.67	3.49	67.81	79.50
Income	$	U.S. annual median household income	54,126.86	53,937.72	1,568.79	51,017.22	56,079.65
Pop. in SNAP	1,000	Average SNAP participation	25,628.46	27,577.25	9,577.45	17,194.33	46,609.07
Price beef	$/lb.	All uncooked beef steaks, U.S. city average	5.22	5.01	0.71	3.64	6.38
Price chicken	$/lb.	Chicken, fresh, whole, U.S. city average	1.09	1.15	0.12	1.00	1.53
Price pork	$/lb.	Chops, center cut, bone in, U.S. city average	3.35	3.37	0.22	2.88	3.85
Unemployment	n.a.	Monthly National Unemployment Rate	5.40	6.11	1.94	3.60	10.60

TABLE 6: SUMMARY STATISTICS FOR VARIABLES IN REGRESSION ANALYSIS (CONTINUED)

Variable	Units	Definition	Median	Mean	Std. Dev.	Min	Max
Dependent variables							
Supply controls							
Price alfalfa	$/lb.	Monthly average of USDA average high and low daily terminal market prices (average of daily prices in Jan. year 1 – Mar. year 1, used for Sept. year 1 – Aug. year 2)	2.13	2.12	0.47	1.49	2.81
Price barley	$/bushel	Monthly USDA farm price received (average of monthly prices in Jan. year 1 – Mar. year 1, used for Sept. year 1 – Aug. year 2)	2.73	3.07	1.05	1.93	5.40
Price corn	$/bushel	Monthly USDA price received by farmers (average of monthly prices in Jan. year 1 – Mar. year 1, used for Sept. year 1 – Aug. year 2)	2.55	2.95	1.17	1.95	6.23
Price wheat	n.a.	Wheat PPI, base year = 1982 (average of monthly prices in Jan. year 1 – Mar. year 1, used for Sept. year 1 – Aug. year 2)	106.43	131.73	65.57	79.30	324.93
Spring yield	cwt/acre	USDA annual spring potato yield (annual value in year 1, used for Mar. year 1 – Feb. year 2)	288.00	285.86	15.09	233.00	314.00
Summer yield	cwt/acre	USDA annual summer potato yield (annual value in year 1, used for June year 1 – May. year 2)	320.00	318.77	23.93	278.00	373.00
Fall yield	cwt/acre	USDA annual fall potato yield (annual value in year 1, used for Sept. year 1 – Aug. year 2)	403.00	395.37	21.83	356.00	429.00
Price gasoline	$/gallon	U.S., all grades, all formulations, retail gasoline prices	2.21	2.30	0.87	0.96	4.11

TABLE 7: REGRESSION RESULTS FOR U.S. AVERAGE SHIPPING POINT PRICES OF FRESH AND RUSSET POTATOES

Dependent variable: Monthly average of USDA average high and low daily prices ($/cwt)

Model	Fresh		Russet	
Independent variable	Coefficient	Robust S.E.	Coefficient	Robust S.E.
Conduct Conditions				
Impact	0.263	0.062***	0.397	0.091***
Demand Controls				
Ln(Food away)	2.907	0.432***	4.352	0.614***
Ln(Income)	-6.331	1.452***	-7.706	2.025***
Ln(Pop. In SNAP)	-1.312	0.207***	-1.546	0.265***
Ln(Price beef)	-0.804	0.315**	-0.545	0.486
Ln(Price chicken)	-0.782	0.404*	-0.715	0.532
Ln(Price pork)	1.346	0.278***	1.737	0.408***
Ln(Unemployment)	0.150	0.128	0.275	0.164*
Supply controls				
Ln(Price alfalfa)	-0.272	0.240	-0.180	0.320
Ln(Price barley)	0.729	0.130***	0.986	0.186***
Ln(Price corn)	-0.465	0.149***	-0.401	0.210*
Ln(Price wheat)	0.226	0.065***	0.201	0.086**
Ln(Spring yield)	0.457	0.187**	0.779	0.244***
Ln(Summer yield)	-1.351	0.192***	-1.571	0.251***
Ln(Fall yield)	-4.282	0.698***	-7.375	1.080***
Interactions with Ln(Gasoline)				
1*Ln(Gasoline)	0.250	0.129*	0.459	0.178**
2*Ln(Gasoline)	0.257	0.147*	0.516	0.201**

3*Ln(Gasoline)	0.434	0.148***	0.626	0.200***
4*Ln(Gasoline)	0.489	0.147***	0.708	0.190***
5*Ln(Gasoline)	0.415	0.132***	0.647	0.171***
6*Ln(Gasoline)	0.278	0.172	0.569	0.213***
7*Ln(Gasoline)	0.250	0.171	0.528	0.263**
8*Ln(Gasoline)	0.266	0.165	0.496	0.233**
9*Ln(Gasoline)	0.172	0.126	0.334	0.167**
10*Ln(Gasoline)	0.165	0.125	0.330	0.162**
11*Ln(Gasoline)	0.181	0.130	0.373	0.170**
12*Ln(Gasoline)	0.232	0.115**	0.413	0.152***
Time Trend	Yes		Yes	
Month Fixed Effects	Yes		Yes	
Number of Observations	172		172	
R-Squared	0.87		0.81	
Number of USDA Price Observations	322,495		220,943	
Period	1998:09-2012:12		1998:09-2012:12	

Notes:
*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

Table 8 presents the results of estimating equation (1) at the wholesale level for fresh and Russet potatoes. The estimated values of the coefficients for the impact variable in the two regressions are statistically significant at the 1% level.

TABLE 8: REGRESSION RESULTS FOR U.S. AVERAGE WHOLESALE PRICES OF FRESH AND RUSSET POTATOES

Dependent variable: Monthly average of USDA average high and low daily prices ($/cwt)

Model	Fresh		Russet	
Independent variable	Coefficient	Robust S.E.	Coefficient	Robust S.E.
Conduct Conditions Impact	0.218	0.042***	0.311	0.063***
Demand Controls				
Ln(Food away)	1.813	0.330***	2.866	0.474***
Ln(Income)	-4.501	0.926***	-5.798	1.427***
Ln(Pop. In SNAP)	-0.781	0.133***	-1.028	0.188***
Ln(Price beef)	-0.277	0.215	-0.230	0.349
Ln(Price chicken)	-0.250	0.272	-0.218	0.404
Ln(Price pork)	0.814	0.199***	1.021	0.307***
Ln(Unemployment)	0.140	0.093	0.200	0.129
Supply controls				
Ln(Price alfalfa)	0.190	0.164	0.061	0.228
Ln(Price barley)	0.385	0.096***	0.624	0.147***
Ln(Price corn)	-0.195	0.110*	-0.226	0.159
Ln(Price wheat)	0.150	0.043***	0.129	0.060**
Ln(Spring yield)	0.162	0.125	0.541	0.178***
Ln(Summer yield)	-0.857	0.144***	-1.183	0.199***
Ln(Fall yield)	-2.102	0.413***	-4.581	0.797***
Interactions with Ln(Gasoline)				
1*Ln(Gasoline)	0.249	0.087***	0.393	0.129***
2*Ln(Gasoline)	0.270	0.096***	0.430	0.146***
3*Ln(Gasoline)	0.316	0.101***	0.527	0.154***
4*Ln(Gasoline)	0.332	0.103***	0.567	0.144***
5*Ln(Gasoline)	0.291	0.089***	0.511	0.124***
6*Ln(Gasoline)	0.263	0.103**	0.412	0.143***
7*Ln(Gasoline)	0.263	0.108**	0.401	0.170**
8*Ln(Gasoline)	0.253	0.120**	0.388	0.179**
9*Ln(Gasoline)	0.236	0.081***	0.318	0.112***
10*Ln(Gasoline)	0.252	0.081***	0.317	0.111***

11*Ln(Gasoline)	0.244	0.085***	0.312	0.119***
12*Ln(Gasoline)	0.249	0.076***	0.345	0.108***
Time Trend	Yes		Yes	
Month Fixed Effects	Yes		Yes	
Number of Observations	172		172	
R-Squared	0.92		0.85	
Number of USDA Price Observations	2,208,885		1,320,096	
Period	1998:09-2012:12		1998:09-2012:12	

Notes:
*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

Table 9 presents the results of estimating equation (1) at the shipping point level by location for fresh potatoes. The estimated values of the coefficients for the impact variable in the regressions are statistically significant at conventional levels, with the exceptions of Michigan and Northwestern Washington.

TABLE 9: SUMMARY OF REGRESSION ANALYSIS FOR AVERAGE SHIPPING POINT PRICE OF FRESH POTATOES BY LOCATION

Variety	Location	Number of Months	Impact Coefficient	R-Squared	Price Effect (%)
Fresh	All locations	172	0.26***	0.87	30.0
Fresh	Aroostook County Maine	114	0.45***	0.93	57.2
Fresh	Canada (New Brunswick) Crossings Through Maine Points	127	0.57***	0.89	76.4
Fresh	Central Wisconsin	170	0.22***	0.89	24.7
Fresh	Columbia Basin Washington & Umatilla Basin Oregon	172	0.50***	0.79	65.5
Fresh	Klamath Basin, Northern California And Oregon	134	0.30**	0.82	35.6
Fresh	Long Island, New York	95	0.17***	0.97	18.2
Fresh	Michigan	113	0.04	0.94	4.6
Fresh	Minnesota-North Dakota (Red River Valley)	130	0.18*	0.90	19.2
Fresh	Northwestern Washington	117	0.02	0.79	2.3
Fresh	San Luis Valley, Colorado	165	0.17**	0.79	18.4
Fresh	Upper Valley, Twin Falls-Burley District Idaho	172	0.33***	0.77	39.2

Notes:
*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

Table 10 presents the results of estimating equation (1) at the shipping point level by location for Russet potatoes. The estimated values of the coefficients for the impact variable in the regressions are statistically significant at conventional levels, with the exception of Michigan.

TABLE 10: SUMMARY OF REGRESSION ANALYSIS FOR AVERAGE SHIPPING POINT PRICE OF RUSSET POTATOES BY LOCATION

Variety	Location	Number of Months	Impact Coefficient	R-Squared	Price Effect (%)
Russet	All locations	172	0.40***	0.81	48.7
Russet	Aroostook County Maine	107	0.24*	0.87	27.3
Russet	Canada (New Brunswick) Crossings Through Maine Points	127	0.57***	0.89	76.2
Russet	Central Wisconsin	163	0.31***	0.87	36.3
Russet	Columbia Basin Washington & Umatilla Basin Oregon	172	0.48***	0.79	62.1
Russet	Klamath Basin, Northern California And Oregon	134	0.30**	0.82	35.6
Russet	Michigan	111	0.04	0.94	4.1
Russet	San Luis Valley Colorado	165	0.37***	0.82	44.2
Russet	Upper Valley, Twin Falls-Burley District Idaho	172	0.33***	0.77	39.2

Notes:
*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

Table 11 presents the results of estimating equation (1) at the wholesale level by location for fresh potatoes. The estimated values of the coefficients for the impact variable in the regressions are statistically significant at the 1% level.

TABLE 11: SUMMARY OF REGRESSION ANALYSIS FOR AVERAGE WHOLESALE PRICE OF FRESH POTATOES BY LOCATION

Variety	Location	Number of Months	Impact Coefficient	R-Squared	Price Effect (%)
Fresh	All locations	172	0.22***	0.92	24.4
Fresh	Atlanta	172	0.18***	0.93	19.5
Fresh	Baltimore	172	0.28***	0.91	31.9
Fresh	Boston	172	0.24***	0.94	26.7
Fresh	Chicago	172	0.21***	0.88	23.9
Fresh	Columbia	172	0.35***	0.90	42.5
Fresh	Dallas	172	0.22***	0.85	24.8
Fresh	Detroit	172	0.24***	0.91	26.9
Fresh	Los Angeles	172	0.29***	0.80	33.7
Fresh	Miami	172	0.22***	0.88	25.0
Fresh	New York	172	0.15***	0.87	16.5
Fresh	Philadelphia	172	0.19***	0.88	21.3
Fresh	Pittsburgh	168	0.21***	0.93	24.0
Fresh	San Francisco	172	0.22***	0.86	24.2
Fresh	Seattle	172	0.16***	0.87	17.6
Fresh	St. Louis	172	0.17***	0.91	18.4

Notes:
*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

Table 12 presents the results of estimating equation (1) at the wholesale level by location for Russet potatoes. The estimated values of the coefficients for the impact variable in the regressions are statistically significant at the 1% level.

TABLE 12: SUMMARY OF REGRESSION ANALYSIS FOR AVERAGE WHOLESALE PRICE OF RUSSET POTATOES BY LOCATION

Variety	Location	Number of Months	Impact Coefficient	R-Squared	Price Effect (%)
Russet	All locations	172	0.31***	0.85	36.5
Russet	Atlanta	172	0.21***	0.89	23.1
Russet	Baltimore	172	0.35***	0.86	41.5
Russet	Boston	172	0.35***	0.89	41.3
Russet	Chicago	172	0.37***	0.83	44.7
Russet	Columbia	172	0.35***	0.83	42.3
Russet	Dallas	172	0.31***	0.79	36.2
Russet	Detroit	172	0.25***	0.84	28.8
Russet	Los Angeles	172	0.41***	0.81	50.9
Russet	Miami	172	0.25***	0.84	28.8
Russet	New York	172	0.35***	0.83	41.6
Russet	Philadelphia	172	0.33***	0.82	39.5
Russet	Pittsburgh	168	0.33***	0.85	38.5
Russet	San Francisco	172	0.33***	0.82	39.3
Russet	Seattle	172	0.34***	0.83	40.8
Russet	St. Louis	172	0.30***	0.81	34.3

Notes:
*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

DATA SOURCES, TABLES 6–12:

BUREAU OF LABOR STATISTICS, U.S. DEP'T OF LABOR, AVERAGE RETAIL FOOD & ENERGY PRICES, U.S. CITY AVERAGE & MIDWEST REGION, http://www.bls.gov/ro3/apmw.htm.

BUREAU OF LABOR STATISTICS, U.S. DEP'T OF LABOR, CONSUMER EXPENDITURE SURVEY (Aug. 2016), http://www.bls.gov/cex/#data.

BUREAU OF LABOR STATISTICS, U.S. DEP'T OF LABOR, DATABASES, TABLES & CALCULATORS BY SUBJECT, http://data.bls.gov/timeseries/LNS14000000 (last visited Dec. 21, 2016).

FOOD & NUTRITION SERV., U.S. DEP'T OF AGRIC., SUPPLEMENTAL NUTRITION ASSISTANCE PROGRAM (SNAP), http://www.fns.usda.gov/pd/supplemental-nutrition-assistance-program-snap (last visited Dec. 21, 2016).

INDEX MUNDI, WHEAT DAILY PRICE, http://www.indexmundi.com/commodities/?commodity=wheat&months=240 (last visited Dec. 21, 2016).

NAT'L AGRIC. STATISTICS SERV., U.S. DEP'T OF AGRIC., POTATOES ANNUAL SUMMARY, http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1123 (last visited Dec. 21, 2016).

U.S. CENSUS BUREAU, MEDIAN HOUSEHOLD INCOME BY STATE: 1984 TO 2012, https://www.census.gov/hhes/www/income/data/statemedian/index.html (last visited Dec. 21, 2016) (aggregate data on file with author).

U.S. DEP'T OF AGRIC., SHIPPING POINT REPORTS: POTATOES (1998–2014), https://www.marketnews.usda.gov/mnp/fv-report-config-step1?type=shipPrice.

U.S. DEP'T OF AGRIC., WHOLESALE MARKET REPORTS: POTATOES (1998–2014), https://www.marketnews.usda.gov/mnp/fv-report-config-step1?type=shipPrice.

U.S. ENERGY INFO. ADMIN., PETROLEUM & OTHER LIQUIDS, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_nus_w.htm (last visited Dec. 21, 2016).

APPENDIX D

The coefficients in the estimated regressions are used to predict the but-for price P_t^{BF} for each month t in the conduct period as follows:

$$P_t^{BF} = \exp\left(\hat{\alpha} + \hat{\beta} X_t\right), \quad (2)$$

where $\hat{\alpha}$ and $\hat{\beta}$ denote the estimated regression coefficients, and $\exp(\cdot)$ denotes the exponential function.

Figures 7[124] and 8[125] show the actual, predicted, and but-for prices estimated using the regression models for fresh and Russet potatoes, respectively, at the shipping point level. Nationally, the average overcharge attributable to the alleged collusion equals 30.0% for fresh potatoes and 48.7% for Russet potatoes. The vertical dotted line indicates the start of the damage period, October 1, 2005.

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[124] Data Source: U.S. DEP'T OF AGRIC., SHIPPING POINT REPORTS: POTATOES (1998–2014), https://www.marketnews.usda.gov/mnp/fv-report-config-step1?type=shipPrice.

[125] Data Source: U.S. DEP'T OF AGRIC., SHIPPING POINT REPORTS: POTATOES (1998–2014), https://www.marketnews.usda.gov/mnp/fv-report-config-step1?type=shipPrice.

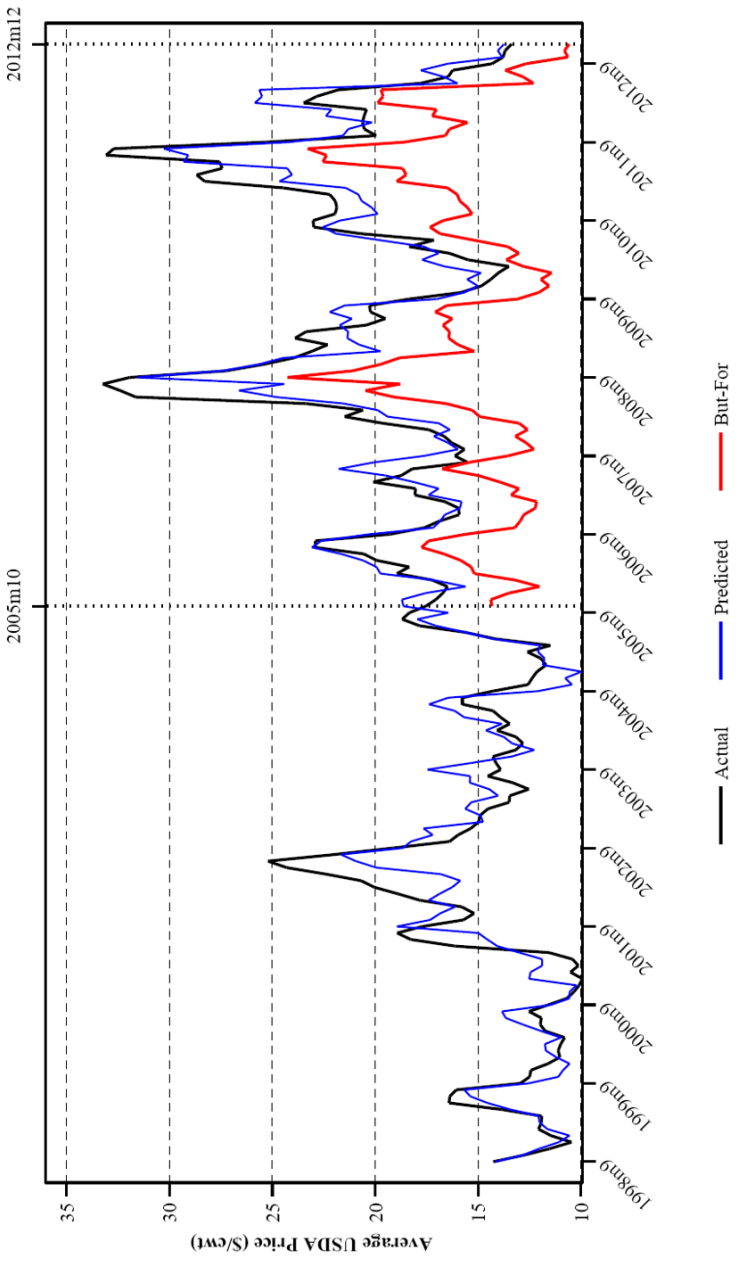

FIGURE 7: ACTUAL, PREDICTED, AND BUT-FOR SHIPPING POINT PRICES OF FRESH POTATOES

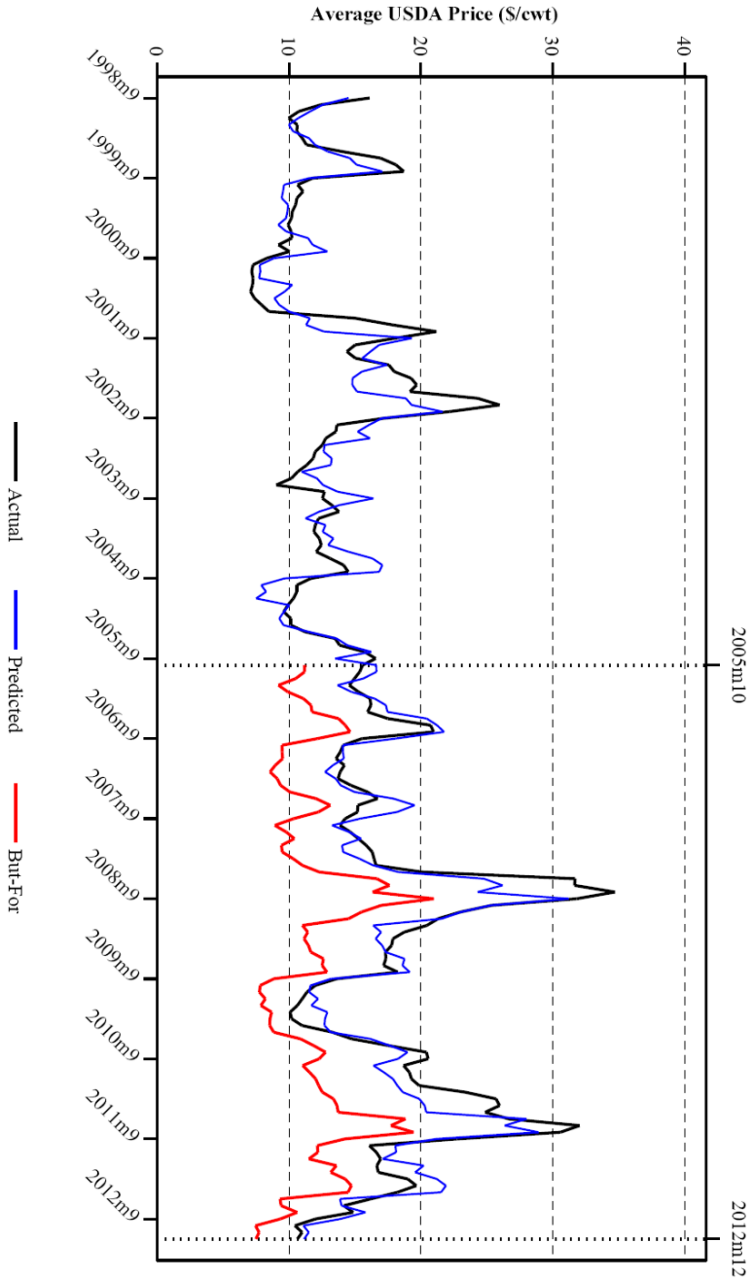

FIGURE 8: ACTUAL, PREDICTED, AND BUT-FOR SHIPPING POINT PRICES OF RUSSET POTATOES

Figures 9[126] and 10[127] show the actual, predicted, and but-for prices estimated using the regression models for fresh and Russet potatoes, respectively, at the wholesale level. The average overcharge at a national level attributable to the alleged collusion equals 24.4% for fresh potatoes and 36.5% for Russet potatoes. The percentage increases at the wholesale level are lower than at the shipping point level. This is to be expected since shipping point prices are generally lower than wholesale prices.

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126 Data Source: U.S. DEP'T OF AGRIC., WHOLESALE MARKET REPORTS: POTATOES (1998–2014), https://www.marketnews.usda.gov/mnp/fv-report-config-step1?type=shipPrice.

127 Data Source: U.S. DEP'T OF AGRIC., WHOLESALE MARKET REPORTS: POTATOES (1998–2014), https://www.marketnews.usda.gov/mnp/fv-report-config-step1?type=shipPrice.

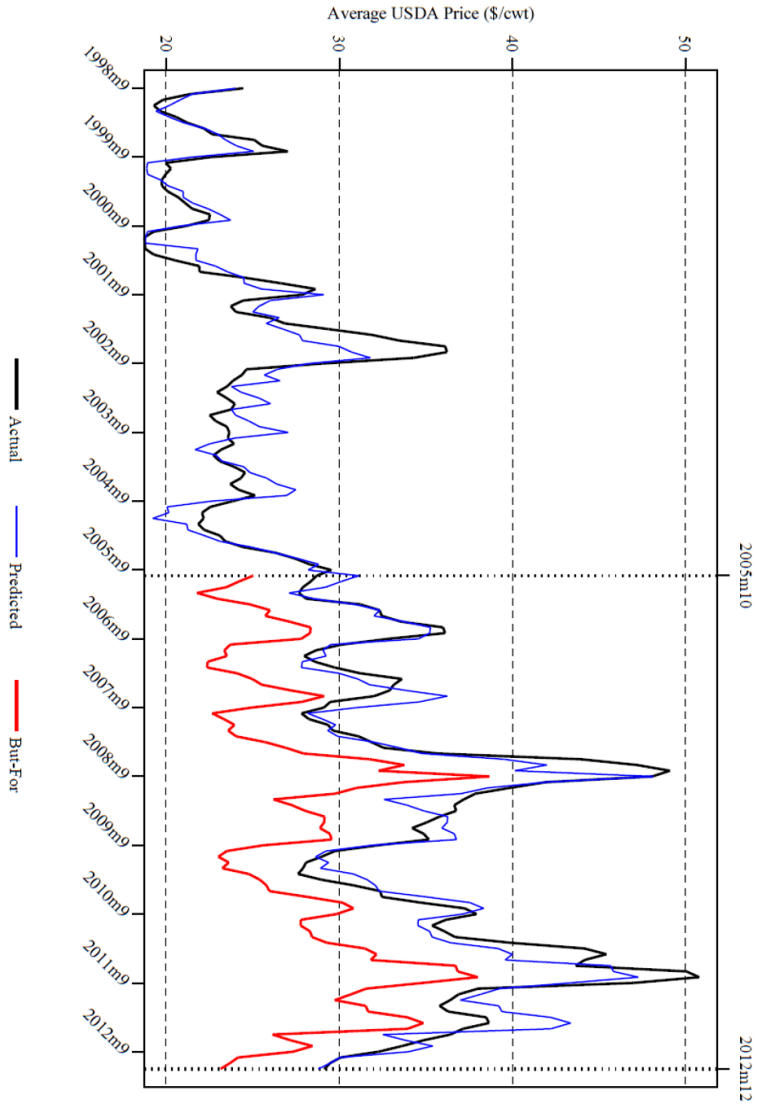

FIGURE 9: ACTUAL, PREDICTED, AND BUT-FOR WHOLESALE PRICES OF FRESH POTATOES

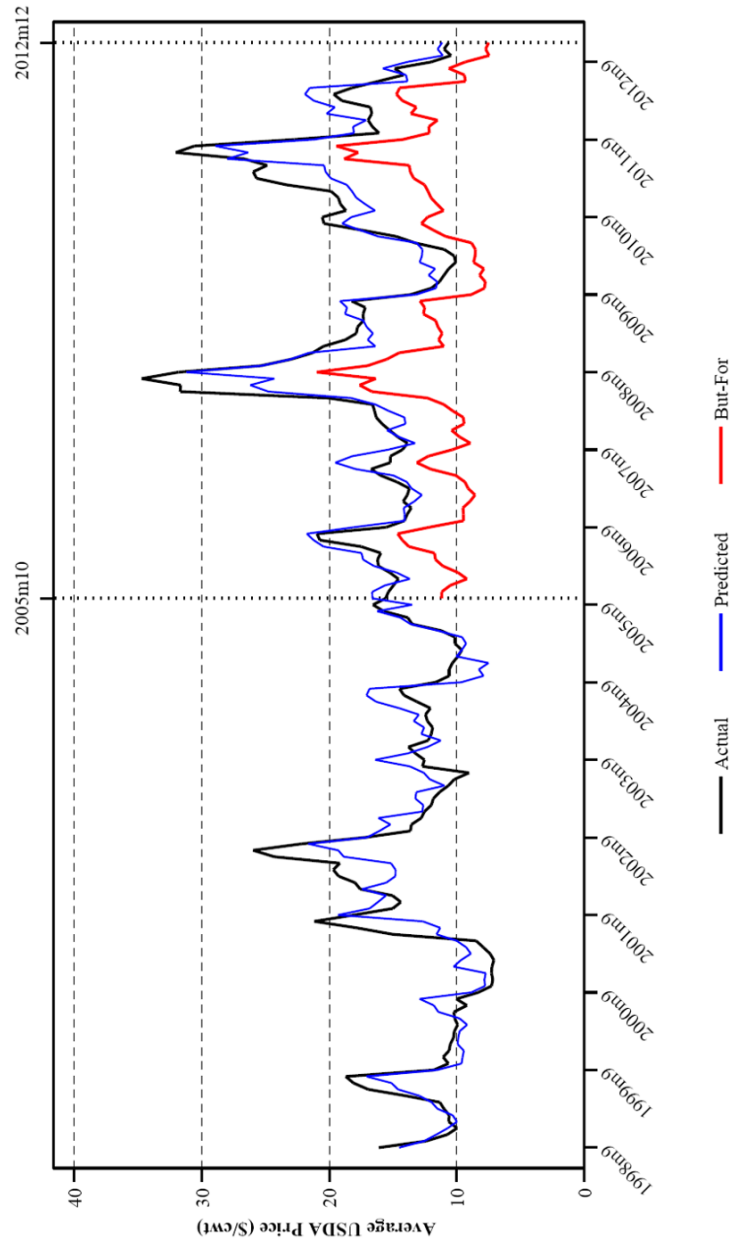

FIGURE 10: ACTUAL, PREDICTED, AND BUT-FOR WHOLESALE PRICES OF RUSSET POTATOES